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INTELLIGENCE SCHOOL

TRAINING MANUAL NUMBER 4

THE OFFICE OF ECONOMIC RESEARCH

OFFICE OF TRAINING

MAY 1969

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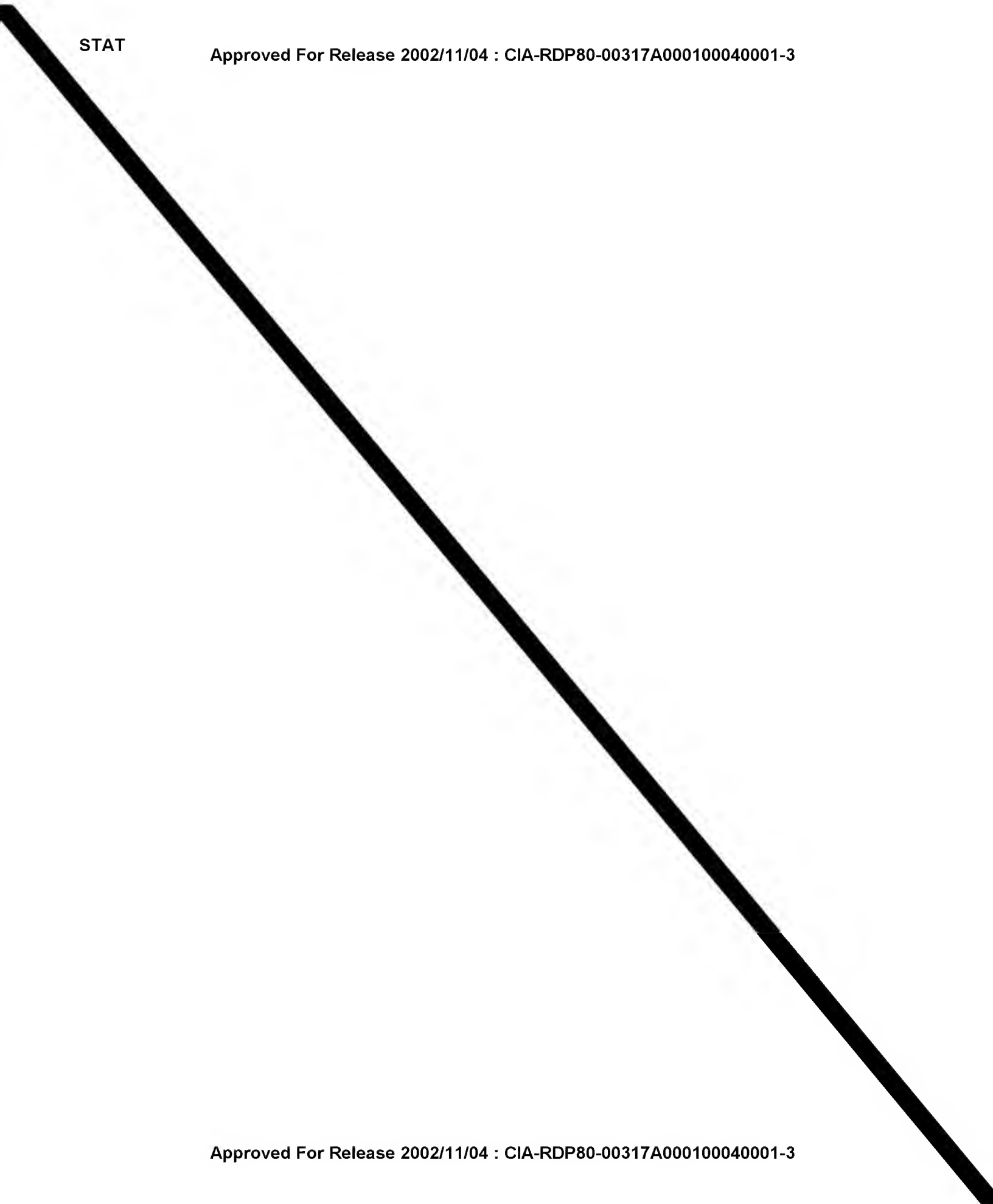
FOREWORD

This volume is designed as a training aid for use in the Intelligence School, Office of Training; and it is intended principally for the use of those Career Trainees whose initial employment will be in the Deputy Directorate for Intelligence. In addition to the Career Trainees, analysts currently engaged in economic research and other professionals who have had occasion to speculate about the responsibilities of the Office of Economic Research may find this manual of interest. It contains a brief text on various aspects of the economic intelligence production activity in this Agency and some thoughts about professionalism in economic intelligence production; it also provides a collection of readings on methodological and philosophical problems. These readings have been prepared by personnel (or former personnel) from the Office of Economic Research. In all instances, the readings have appeared in Studies in Intelligence.

Statistical data in this volume were provided by the Office of Economic Research, and that Office also reviewed the draft of this manual. The content, emphasis, and interpretations are, however, the responsibility of the Intelligence School, Office of Training.



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INTRODUCTION

> "I have met dozens of men who are moved and motivated by the highest and most patriotic and dedicated purposes -- men who are specialists in economics and political science and history and geography and physics and many other fields where logic and analysis are crucial to the decisions that the President of their country is called upon to make. Through my experience with these men I have learned that their most significant triumphs come not in the secrets passed in the dark but in patient reading, hour after hour, of highly technical periodicals.
>
> In a real sense they are America's professional students; they are unsung just as they are invaluable."*

These words of praise from President Johnson for the professional research activities of Agency officers probably were noted with as much pride by members of the Office of Economic Research (OER)** as by those of any other Agency component. From its struggles early in the 1950's for recognition of its developing competence in intelligence research on economic-industrial activities in the Communist countries through increasing requests in the late 1950's and early 1960's for assessments on the non-Communist nations, the Office of Economic Research (OER) has now firmly established its "credibility" both within and without the intelligence community. Today OER can be expected to produce not only such items as "Czechoslovakia: The Economic Meaning of Enforced Soviet Control" and "Implications of Moscow-New York Air Service," but also such broad-scale reports as "The World Gold Market,"

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*From remarks made by President Lyndon B. Johnson at the swearing-in ceremony for Mr. Richard Helms as Director of the Central Intelligence Agency. CIA, Headquarters Employee Bulletin, 1 July 1966, p. 2. U.

**The designation as the Office of Economic Research dates back to 1 July 1967. From the early 1950's to that date it was called the Office of Research and Reports.

"Invasion of the European Capital Market by US Firms," and "Road Construction and Wet Weather Logistics in the Leotian Panhandle."*

The formal directives under which OER has developed these ever broadening responsibilities in the production of economic intelligence, its place in the USIB structure, its interest in "professionalism," and a detailed study of some of the problems encountered and methodologies employed in solving such problems should give one a better understanding of this particular component of the Directorate of Intelligence.

AUTHORIZATION

Authority for the production of economic intelligence in the USIB community is provided by Paragraphs 7a - 7c of NSCID No. 3 (New Series)** which state that:

> a. "The Department of State shall produce political and sociological intelligence on all countries, and economic intelligence on countries outside the Sino-Soviet Bloc."
>
> b. "The Department of Defense shall produce military intelligence. This production shall include scientific, technical, and economic intelligence directly pertinent to the missions of the various components of the Department of Defense."
>
> c. "The Central Intelligence Agency shall produce economic intelligence on the Sino-Soviet Bloc and scientific and technical intelligence as a service of common concern. Further, the Central Intelligence Agency may produce such other intelligence as may be necessary to discharge the statutory responsibilities of the director of Central Intelligence."

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*Respectively, ER IM 68-107, August 1968 (C), ER IM 68-88, July 1968 (C), ER IM 68-86, July 1968 (S), ER IM 68-89, July 1968 (C), and ER IM 68-74, June 1968 (S).

**Revised, 18 January 1968. (S)

Also NSCID No. 1 implies that among his other duties the Director of Central Intelligence (DCI) is responsible for the coordination of economic intelligence.*

More explicit on both the production and coordination aspects of economic intelligence than either of the NSCID's is DCID No. 3/1 (New Series), particularly in its stress on the importance of the Economic Intelligence Committee (EIC) of the USIB.** It should be noted in passing that, as with most of the other USIB Committees, the EIC Chairman and Secretariat are to be CIA personnel; and the Director of OER is the Chairman of the EIC.

FUNCTIONS

In addition to the broad guidance provided by the referenced NSCID's and DCID No. 3/1, specific guidance for OER on a Branch-by-Branch basis is set forth in a recent OER regulation. The functions of the Director of OER, as given in this regulation, make it apparent how broad a charter is held by this production component. The Director of OER has the responsibility to:***

a. Produce and issue all-source economic analyses of the internal structure, recent development, future prospects, external economic relations, and strengths and weaknesses of all Communist countries and of all non-Communist countries of significance to national policy.

b. Provide economic intelligence contributions and other support to the national estimates production program of ONE, to current intelligence publications of OCI, and to the National Intelligence Survey program of OBGI.

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*NSCID No. 1 (New Series), Revised 4 March 1964. (S)

**DCID No. 3/1 appears as Appendix A to this training manual. "The Economic Intelligence Committee (EIC) was established by the Intelligence Advisory Committee (IAC) on 29 May 1951 (IAC-D-22/1 Revised). Its terms of reference were revised and reissued as Paragraph 3 of DCID 3/1.... Since 15 September 1958, the EIC has functioned as a Committee of the United States Intelligence Board (USIB)." USIB/EIC. Annual Report to the USIB of the Economic Intelligence Committee, July 1967-June 1968. EIC-D-678. August 1968, p. 1. (S)

***OER, Office Regulation 1-13, Statements of Mission and Functions, 1 July 1968, p. 2. (S)

c. Produce such additional all-source economic intelligence as directed.

d. Initiate collection requirements for his Office and provide evaluation and guidance in support of collection activity.

e. Serve as Chairman of the Economic Intelligence Committee of the USIB and provide its secretariat.

f. Represent the Agency on the Economic Defense Advisory Committee and the Advisory Committee on Export Policy.

Note in particular that the production efforts of the Office are the result of research on an all-source basis and that the research focuses not only on the Communist nations, but also on "all non-Communist countries of significance to national policy." The continuing economic difficulties of newly independent nations and the continual emergence of new crisis situations would seem to insure steady employment for OER personnel.

ORGANIZATION

To meet its obligations, OER is organized as noted in Chart 1.* Research activities are carried on under two broad areas, the Communist Research Area and the International Research Area. Each area has an amalgam of functional and regional Branches. Even so, there are many economic intelligence problems that call for a high degree of intra- and inter-area cooperation and coordination. The responsibilities of the Areas, Divisions and Branches which appear on the OER chart are expressed in OER Office Regulation 1-13, Statement of Missions and Functions, 1 July 1968, and these responsibilities appear as Appendix B in this manual.

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*Chart 1 follows p. 4.

**Appendix B, page 159.

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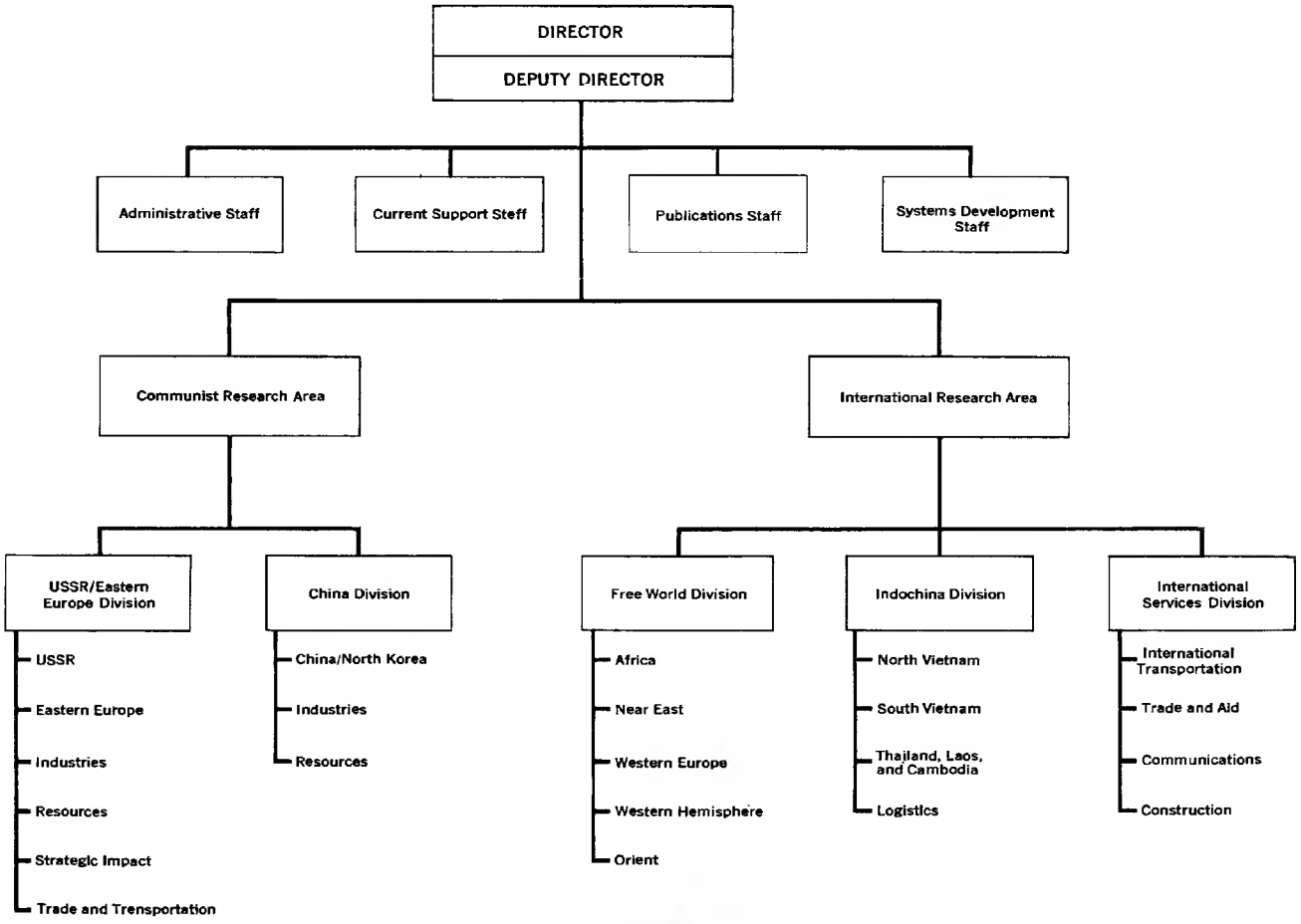
CHART 1

OFFICE OF ECONOMIC RESEARCH



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PRODUCTION OF ECONOMIC INTELLIGENCE

Type and Volume of Reports

Prior to the early 1960's, CIA's economic intelligence analysis had focused principally on developments in the Soviet Union and the other Communist nations. Such research as was done on non-Communist areas during the late 1950's and early 1960's was usually predicated on some direct relationships between a "free" or "neutralist" country and the Soviet Union or other Communist countries--trade and aid activities had traditionally been high on the list of economic intelligence priorities. As Soviet efforts to trade petroleum, other raw materials, and finished products (including military hardware and advanced weapons systems) increased, so too did the time and effort devoted to intelligence production on the economies of the newly independent and/or less developed areas which were among the chief Communist targets.

Interestingly, the economic intelligence estimators of OER appear to have at least kept abreast of -- and in some instances have been well in advance of -- the requests of the policy makers. Considering the concern of US policy officers with foreign announcements of budget revisions (including defense budgets), economic plans, or new industrial developments, the need for a "nose for news" is no longer the exclusive province of current intelligence analysts. OER reporting is in tune with the times. The in-depth, long-term, book-length, grimly detailed, and deadly dull report--albeit "good intelligence"--which was characteristic of the Intelligence Report (IR) series in the days when OER was still establishing its "credibility"* is no longer acceptable.

The most characteristic, formal publication of the OER presently is in the format of the Intelligence Memorandum (IM) -- a sharply focused, free-flowing, usually current report averaging 10 to 12 pages. As noted in Table 1,** the IM series made up almost 50 per cent

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*For some excellent thoughts on the need for a good "credibility" record in the intelligence business, see Sherman Kent, "Estimates and Influence," Studies in Intelligence, Vol. 12, No. 3, Summer 1968, pp. 11-21. C/[redacted]

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**Table 1 follows p. 5.

TABLE 1

OER Published Production: Types of Reports by Geographical Areas, Calendar 1968 [a]

Type of Publication	World Wide	Vietnam War	Communist Countries: General	USSR	Eastern Europe	China	North Korea	Cuba
Serially Numbered								
Report		2		2	1	1		1
Memorandum	8	43	5	9	12	10	2	5
Handbook	1			1				1
Biweekly								
Other EIC						2		
Unnumbered								
NIS				3	2	1	1	
Special Vietnam		70						
Miscellaneous	4			3	2	4	4	1
Total	13	115	5	18	17	18	7	8

Type of Publication	Free World: Asia	Africa	Middle East	Western Europe	Latin America	Less Developed Countries (general)	Total
Serially Numbered							
Report		1	1			1	10
Memorandum	20	18	13	10	9	1	165
Handbook							3
Biweekly						26	26
Other EIC						3	5
Unnumbered							
NIS	5	7	5	3	8		35
Special Vietnam							70
Miscellaneous		1	1	3		1	24
Total	25	27	20	16	17	32	338

[a] Data provided by OER.

of total OER published production in calendar year 1968. As both Table 1 and Chart 2* show, the largest part of the IM and all other OER publications -- in excess of 40 per cent of the total number of items published in 1968 -- was on Free World areas. All categories of reporting on the Vietnam war accounted for 33 per cent of total published production in the same period.

In contract, little more than 20 per cent of OER's published production was on Communist countries; and on the USSR and Eastern Europe, less than 10 per cent. Studies in world-wide economic intelligence problems represented less than 5 per cent of the more than 300 items produced.

Support Activity

It has already been mentioned that much of the OER production effort is in response to the needs of policy makers or other non-CIA requesters. Table 2,** showing the numbers of papers prepared in response to internal and external requesters in 1967 and through the first seven months of 1968 illustrates this point. Although much of OER's production in response to internal intelligence needs -- contributions to National Intelligence Estimates, chapters for National Intelligence Surveys, and materials for the Office of Current Intelligence involves highly significant intelligence problems, there are often more critical issues involved in that portion of OER's production which responds to external requests.

One or two specific instances will serve to illustrate the importance of the questions being asked of OER. Largely as a result of requests from the Department of Defense for various types of estimates -- including some aspects of cost-effectiveness -- OER found it necessary to devote special attention to the Vietnam war. From tentative beginnings, including a Task Force approach, the Office found it necessary to issue a series of reports of high sensitivity for its policy-oriented requesters and more mundane serial reports (e.g., the monthly Foreign Shipping to North Vietnam series) for its intelligence customers. Eventually it was necessary to organize a new Division -- the Indochina Division in the International Research Area -- for the Vietnam research effort. Although

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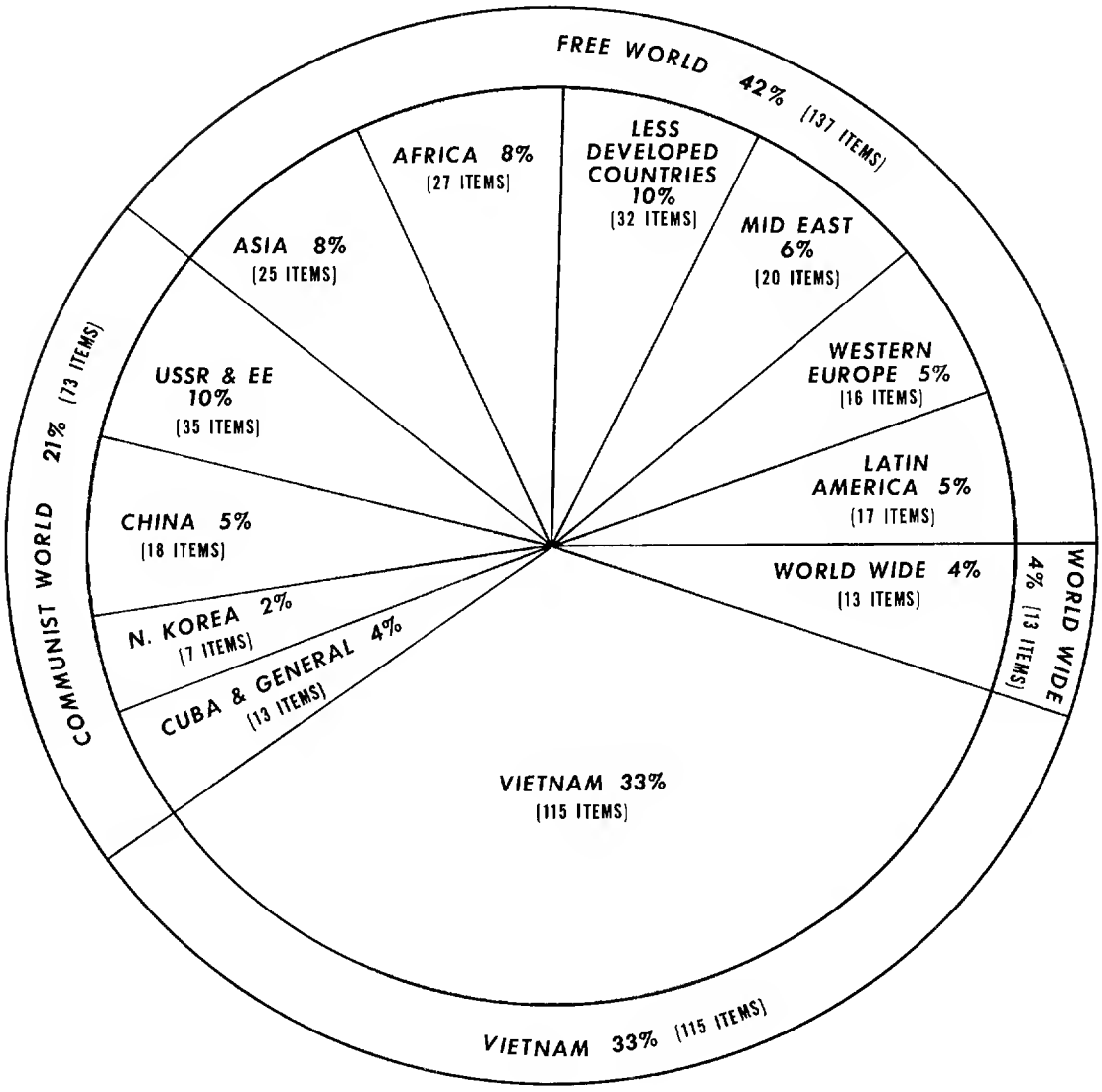
*Chart 2 follows p. 6.

**Table 2 follows p. 6.

CHART 2

OER PUBLISHED PRODUCTION

BY GEOGRAPHIC AREAS CALENDER 1968



TOTAL NUMBER OF PUBLICATIONS....338

TABLE 2

OER Economic Intelligence Support Activity
1967 and January-July 1968[a]

	1967	Jan-Jul 1968
Papers Produced in Response to Specific Requests[b]		
External		
White House	47	19
Congress	19	10
State	96	39
Defense	57	43
ACDA	6	1
Other Federal Agencies	15	6
ACEP-EDAC (Including COCOM List Review)	251	150
Other Interagency Groups	22	33
Foreign Governments	33	24
Non-government	3	1
Contributions to Intelligence Issuances of Other Offices		
Office of National Estimates (NIE's)	41	17
Office of Basic and Geographic Intelligence (NIS's)	38	21
Office of Current Intelligence	461	306
Weekly Watch Committee Report	337	167

a/ Data provided by OER.

b/ Includes unpublished, typescript memoranda issued only to the requester.

this Division has extensive internal capabilities and manpower, it relies heavily on other OER components, particularly those which specialize in transportation, shipping, and construction, for help in meeting its obligations.

Similarly, the various stages of rapprochement with the Soviet Union and the East European nations have traditionally involved intelligence support for the study of a multitude of special problems. The substantive expertise of OER personnel has been called on extensively in such discussions as the Congressional inquiries on the status of the Soviet and Communist Chinese economies, on the significance of the proposed Fiat-USSR automobile agreement, and on President Johnson's program for "building bridges with the East European nations through the expansion of trade.

Personnel

Of approximately [ ] professional intelligence officers in OER ranks in mid-summer 1968, about 25 per cent had less than two years of service in the office; about 20 per cent, two through five years, 10 per cent, six through ten years; and nearly 45 per cent had more than ten years of service. In many of the areas of substantive expertise, individuals with long service records in OER also have continuity in specialty areas (e.g., fuels and power, transportation, construction, and communications among others). 25X1A

Historically and traditionally, the professional complement in economic intelligence has been a highly educated group who, by and large, came into intelligence research primarily through the efforts of OER or Agency recruiters rather than as reassignees from other Agency components or as graduates of the Career Training program. Table 3 shows how OER acquired its new professional personnel during the past three years.

TABLE 3

Recruitment of Professional Personnel by OER[a/]

	FY '66	FY '67	FY '68
Number of direct hires	31	45	39
Number reassigned from other Agency components	8	7	4
Number from Career Training Program	2	7	7
TOTAL	41	59	50

a/ Data provided by OER.

Ninety-eight per cent of the professional intelligence officers in OER hold one or more college degrees: for 32 per cent the B.A. is the highest degree attained; for 52 per cent, the M.A.; for 6 per cent, the M.A. plus all requirements for the PhD. except the dissertation; and for 8 per cent, the PhD. Formal training in economic theory is of paramount concern to OER, and personnel, particularly junior grades, are encouraged to take either after-hours or full-time college credit programs. In the past five years, 23 OER personnel have had full-time academic training. Of these 23, one has received a MPA degree and four have received their M.A. degrees. Most of the remaining 18 individuals who were on full-time academic training are pending completion of their dissertations for their Ph.D. *

Although all four of the OER employees who are in full-time academic training in FY '69 are in graduate-level programs at a local university (American), in previous years such training has been taken at the University of California (Berkeley), Brown University, Columbia University, and Ohio State University. In addition to the full-time programs, OER also has long had arrangements with both American and George Washington universities whereby credit courses in economics, on both the graduate and undergraduate level, are offered after hours at the CIA Headquarters. Various OER supervisory personnel are accredited as faculty representatives at the respective universities and teach the courses.

*Data provided to OTR/IS by OER, February 1969

In addition to formal schooling, there is a significant amount of on-the-job training that is acquired as one becomes more senior in OER. Extensive use is made of field and orientation trips -- this is particularly true for those who are involved in functional areas of research; opportunities are freely available through the [redacted] for direct contact with industrial, business, or academic specialists as the need arises; and strong support is given to participation in professional societies. Prior to the severe restrictions necessitated by US balance of payments problems, OER personnel were encouraged to attend various international meetings -- the World Petroleum Congress, for example -- which would be dealing with work-related problems; and four to six weeks of TDY in non-Communist countries was rather usual for purposes of area orientation or for discussion of special intelligence problems. *

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The Production and Review Cycle

As with other major segments of the Deputy Directorate of Intelligence, the principal function of OER is to produce finished intelligence. The production cycle noted in Chart 3** is similar to that in the offices of Strategic Research, Current Intelligence, and National Estimates. The process has many features in common with academic research and, to a more limited extent, journalism. There are, however, certain significant differences. The following comments may help to illustrate some of these distinctions at various stages in the production process noted in Chart 3. In the area of Preliminary Preparation, for example, note that:

> Definition of the intelligence problem is usually a shared effort in OER. Regardless of the origin of a request, it has become usual for OER to have some

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*Additional foreign and domestic travel was also possible for some OER professionals with Russian language fluency to serve as interpreters or delegates for scientific-technical exchange delegations. Several OER professionals also have had an opportunity [redacted] 25X1A
No. 2, Spring 1968, pp. 43-51. C.

**Chart 3 follows p. 9.

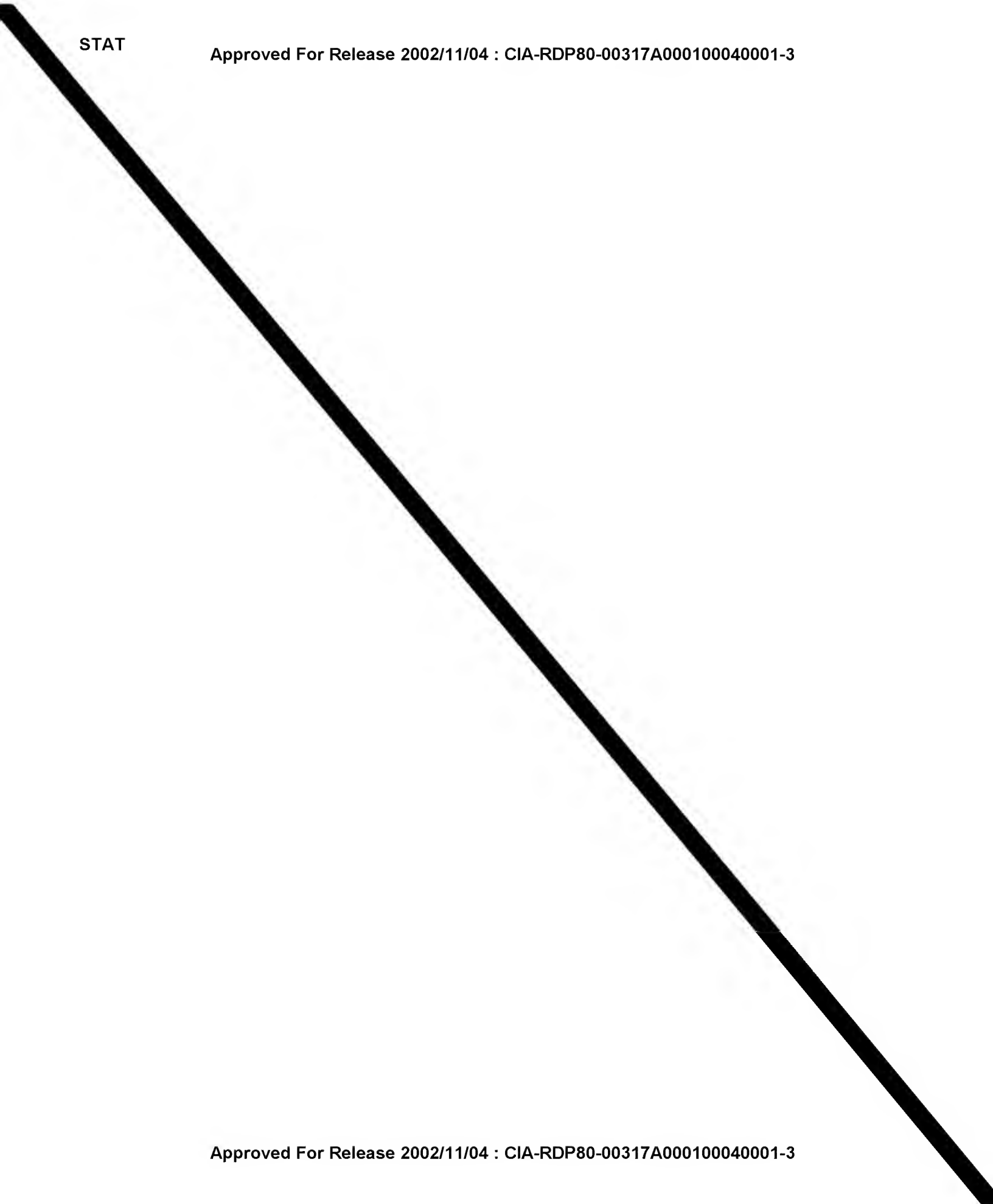


CHART 3

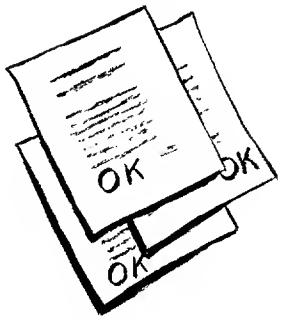
PRODUCING ECONOMIC INTELLIGENCE

PRELIMINARY PREPARATION

1. *Define problem -- requester and purpose*
2. *Note deadline*
3. *Determine format*
4. *Assign production responsibilities*

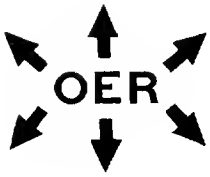
ANALYTICAL PROCEDURE

1. *Historical review -- check published reports*
2. *Data survey -- all potential sources, USIB and non-USIB*
3. *Preparation of requirements*
4. *Research -- within given time frame*
5. *Writing draft -- response required*



REVIEW

1. *Branch review*
2. *Review by contributors*
3. *Division review*
4. *Area review*
5. *Office review and final approval*



PUBLICATION AND DISSEMINATION

1. *Editing (format, statistics, and style)*
2. *Dissemination by OER*

advance indication of an upcoming production request and for OER personnel to help shape the request. Although the immediately concerned production Branch frequently will be principally responsible for developing precise terms of reference, the next levels of command -- the Division and/or Area -- usually get involved in this initial process. (Always, when the request comes from the White House or Congress!) Such review permits a better focus and a less parochial view than is likely in academic research, where a single individual may work to suit his own particular bias.

Deadlines for OER products are frequently as tight as for OCI or ONE and can subject the economic intelligence officer to pressures unknown to the academician. Obviously, the depth of analysis is sometimes reduced by the need to hold to a given time frame

Requesters' wants and needs are of primary importance to OER. Where the professors (and even some of the senior journalists) are, for all practical purposes, "masters of their own destinies" insofar as research and writing (reporting) are concerned, the same freedom seldom applies to the OER professional. The emphasis of the 1950's on leisurely, in-depth, long-term, self-initiated research -- much of more academic than intelligence oriented -- came to an end in the early 1960's. As noted previously (see Table 2*), there is a continuing flow of requests for policy support and an ongoing series of NIE, NIS, and other programmed commitments to be met. Such self-initiated research as is done at the present time usually represents an attempt to "crystal ball" an upcoming request.

Joint responsibility for economic intelligence production has become common within OER, particularly as the 1 July 1967 reorganization distributed substantive competence throughout the regional branches within the Office. Also, the heavy current intelligence responsibilities -- particularly reporting on the Vietnam War -- has increased the need for OER coordination with OCI; policy questions may require ONE participation, and the growing concern with military-economics necessitates extensive cooperation with OSR**

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*Table 2 follows p. 6.

**Until 1 July 1967, when OSR was made a separate office, military-economic research had been a responsibility of OER.

In considering Analytical Procedures, the differences between the economic intelligence analyst and the academician also can be sharp and distinct:

In surveying available data, the intelligence officer is dealing not only with many of those same overt sources known to the academic and non-intelligence research community, but he also must survey an additional increment of "all source" classified materials -- the volume of such materials ranging from the minute to the monumental, depending on the particular substantive problem and region under study. As the data survey reveals gaps in the intelligence information, the intelligence researchers may call into play -- as the deadlines permit -- the extensive collection machinery available to USIB members. The effort that can be mounted to fill requirements of the intelligence producers are unmatched in the private or non-USIB sectors in either sophistication or timeliness. Although the collection activity is regulated by formal machinery beginning with the Priority National Intelligence Objectives, OER's requirements are frequently serviced through informal channels.

Perhaps the most critical of all differences between the economic intelligence producer and his academic counterpart is the fact that when called on to produce, the intelligence officer knows that he must respond regardless of data limitations. Unlike the scholar who can abandon a project which appears unfeasible because of data limitations, the OER analyst, sooner or later, must produce an estimate on the basis of a visceral reaction -- even worse, the intelligence specialist may be required to provide estimates or evaluations about subject fields completely unrelated to either his training or experience. As a case in point, OER was asked by the Department of Defense to undertake certain problems of assessing bomb damage in Vietnam. Even though this work was beyond the scope of OER's normal activities, the job was done; and the Office's reputation was enhanced by the quality of the work. (One danger, of course, is that other equally unrelated tasks will be directed to OER on the basis of such performances!)

Deadlines, lack of data, inability to acquire data, and the "unknowableness" factor in given problems, have taught the successful OER analyst to overcome the inhibitions instilled by his academic training and to make the best "guesstimate" he can at a given time. Unlike those

academicians who slide quickly over problem areas, the OER producer has a responsibility, particularly in his guesstimate, to make clear the area and magnitude of his imprecision.

The review of the finished OER product also differs considerably from the procedure normally followed in academic circles:

The first and most severe critiques of both substance and format are made at the section and branch level. Individuals at these levels are most competent to judge substance and, usually, focus. Because the level of branch expertise runs high, these initial review sessions can be quite rigorous. No comparable review situation is required in academic circles, although there is a superficial resemblance in the editing process in journalism.

The nature of review will vary from branch to branch. There may be a single individual (e.g., a senior analyst or a section chief) who says "yes" or "no," or this may be the responsibility of several reviewers, before the branch chief sends the paper forward. The most effective branch chiefs in OER take their sign-off very seriously and accept, with the principal analyst, the responsibility for defending any paper which goes forward. Consequently, there is a parochial interest in maintaining the branch "image," particularly where this image has always been good. Academicians seldom, if ever, participate in such head-knocking reviews as take place within an OER branch.

If a project represents a joint OER effort, contributors also may participate in review sessions. Here, incidentally, reputations of personnel in contributing components can be helped or hindered as a result of an individual's performance as a critic or contributor on a given paper.

Considering the long record of experience of many of the analysts, the Office review of a given OER report generally relies heavily on branch expertise. Queries from the Director's office may go through channels, but commonly go directly to the analyst-author. Unlike the academic community, where neither the dean nor the department chairman is necessarily aware of the research efforts of his associates, OER has no communication gap between the senior OER administrators and the working analyst.

PROFESSIONALISM IN OER

As previously noted, the level of academic training in OER is quite high, with approximately 98 per cent of all professional intelligence officers having obtained at least a B.A. degree. However, the judgment that an economic intelligence officer is "good" or "poor," "professional" or "amateur," is a continuing one by peers -- including branch chiefs, most of whom have themselves progressed through the ranks of substantive analysts -- who have ample opportunities to assess both the research and writing abilities of a given individual. Careerwise, the peer judgments are important because they are usually passed upward.

Economic intelligence estimates, generally well respected by intelligence professionals in other production areas, are far better than those made by private research groups or by the academic and journalistic communities. In 1964, for example, when OER made public its estimates of a declining rate of Soviet economic growth, the academic community and other professional students of the USSR (including among the later, Harry Schwartz of the New York Times) raised considerable objection to the Agency estimates. By the end of 1965, the OER estimates were generally accepted as reasonable. In fact, a leading Soviet economist is reported to have chided his colleagues because the published CIA assessments were better than any comparable estimates available in the USSR.

In OER, unlike the academic community, tests of professionalism are frequent. There is less tolerance of frauds than in academic or news media or than among the ranks of private researchers studying foreign economic-strategic problems. Again, it should be emphasized that the OER analyst has the benefit of all-source collection efforts and a high degree of inter-disciplinary cooperation.

Because it is the subject of so much discussion, particularly among novitiates in the intelligence field and non-OER personnel, the place of the professional economist in OER deserves specific notice. No "good" intelligence officer in OER denies the need for having a stable of competent economists, and similarly he also recognizes the need for technical specialists, linguists, historians, and others. Some of OER's tasks require more sophisticated economic analysis than others. Work assignments are carefully matched to the analyst's training, so that each can contribute his expertise.

The professionalism of OER personnel is also subject to frequent tests outside of the Agency in both the public and private sectors. This dates back to the 1950's with the beginning of serious contacts between OER specialists and industrialists, as Agency people sought technical help or as they began planning for the first of the US-USSR technical exchange visits; and it continues through the present. With numerous requests for contributions to the Joint Economic Committee of Congress (reports on economic growth in the USSR and Communist China) and other similar types of reporting (the Banking and Currency Hearings on the Fiat-USSR deal had the benefit of an unclassified CIA/OER report, for example), the OER image has frequently been projected before the Congress. Either industrial or Congressional experts would be quick to spot any incompetent Agency analysis. Consciousness of Agency image is a continuing concern and undoubtedly imposes more severe restrictions on intelligence officers than on representatives of the non-USIB agencies, industry, or academic institutions.

Professionalism can be measured to some extent by professional writing for public consumption. In the intelligence community, it is always difficult to obtain permission to publish, and OER authors must always struggle with the question of whether or not their publications could embarrass the Agency if they were to be identified as Agency employees; but it is possible to publish articles and books in various disciplines -- many OER employees, in fact, believe that such works attributed to OER personnel should be further encouraged to help improve the Agency image. Whatever the philosophy, the fact is that since 1 January 1965 OER personnel have published at least three books and 20 professional articles. Among the publications by members of the OER career service in 1968, were "A Recent Soviet Study of Economic Growth' (Soviet Studies, April 1968). "How Much Grain Does Communist China Produce?" (The China Quarterly, Spring 1968), "Siberian Syndrome: Fact or Fiction?" (Pacific Historical Review, February 1968), and "Soviet Economic 'Reforms': A Study in Contradictions" (Soviet Studies, July 1968).

SELECTED READINGS

The following readings are either illustrative of the techniques and methodologies which have been employed in solving economic intelligence problems or they provide indications of some of the philosophical concepts regarding the intelligence application of data on foreign economies. [redacted] all authors are, or were, members of the Office of Economic Research.

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THE VALIDITY OF SOVIET ECONOMIC STATISTICS *

Edward L. Allen **

The publication, beginning in 1956, of a variety of Soviet statistical handbooks on the economy of the USSR signalled the end of a twenty-year data drought. This shift from the Stalin-imposed era of virtually complete concealment, when even a report on the production of samovars was considered a state secret, has been most welcome. No longer is the student of the Soviet economy forced to function like an archeologist, spending most of his time digging for individual isolated facts. He now can start with figures which, while far from complete, indeed quite skimpy by comparison with data published on the U.S. economy, provide a sufficient basis for serious analysis.

A sufficient basis, if a valid one. Can we accept these Soviet-supplied data as reliable and bona fide? Has the Central Statistical Agency at the bidding of N. S. Khrushchev perhaps erected a Potemkin village of false figures, deliberately fabricated to deceive the West? Or, alternatively, are the data so distorted at their source on the enterprise level as to be meaningless when aggregated? Both these possibilities are briefly examined in this paper.

Checks at the Enterprise Level

First, let us look at the possibility of falsification at the source. Consider at the outset the environment in which the enterprise director works. He is an instrument of the centrally directed, government-owned and -operated economy. The government collects economic data in order to facilitate planning and as a basis for the allocation system which channels materials and supplies where they are needed to fulfill its objectives. The operation of an economy through a system of material balances, by allocation, requires accurate data. It is therefore to the interest of the central control authorities

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* Studies in Intelligence, Vol. 4, No. 3 (Summer 1960), pp. 1-8.

** Mr. Allen is Director of CIA's Office of Economic Research.

that enterprises provide accurate statistics, and falsification has been made subject to severe punishment.

Yet plant managers do manipulate output and inventory data, at the risk of their careers and stiff jail terms, as evidenced by the many horrible examples cited in the Soviet press and technical journals. Why is it they resort to extralegal practices? The usual reason is that the centrally determined production goal for the enterprise is very high; and also the director is at the mercy of his suppliers in his efforts to fulfill the plan. The successful industrial leader in the Soviet Union, as in the United States, plays the game by the rules which are actually in force, not according to a strict interpretation of legal statutes. The question is whether these manipulations are so widespread or of such a magnitude as to invalidate production figures across the board.

There are a number of in-built controls over the director within the enterprise itself. The chief accountant is responsible to the state for refusing to execute any orders from the director or other senior officials to fudge his accounts and for reporting such demands "up the line." Another plant official, the chief of the quality control department, is subject to imprisonment if he falsely certifies sub-standard products as meeting stipulated technical requirements. A more knowledgeable representative of central authority within the enterprise is the secretary of the Party organization in the plant, and his salary is paid from Party funds, not by the enterprise. The role of the Party apparatus in guiding and monitoring the activities of enterprises has been greatly increased since Stalin's death.

Another completely independent plant official is the chief of the "special section," or secret police, who is extremely well paid and who maintains dossiers on all key enterprise personnel. This enforcement officer is almost certainly aware, through his network of informers, of any shady or illegal activities being carried on in the plant. If some such activities, however, are necessary to carry out the government's plans--black-market purchase of materials needed to meet the current production goals of the enterprise, for example--he may decide to tolerate them.

Finally, the books of the enterprise are subject to inspection by outside agencies reporting directly to the Council of Ministers. Representatives of the Ministry of Finance, periodically collecting profits and taxes, check this aspect of the enterprise's financial performance against the plan. The Ministry of State Control polices all enterprises charged with carrying out the decrees of the Council of Ministers and has broad powers to subpoena the records of any unit under suspicion.

The State Bank also plays an important role as a control and inspection arm of the Council of Ministers. Virtually all financial activities of an enterprise--its purchases, wage payments, sales, etc.--are reflected in the transactions recorded in its account at the Bank's local branch. The Bank is responsible for auditing these transactions to insure that they correspond in detail to the specifications of the plan for production. Capital expenditures of the enterprise are similarly controlled and reviewed by the Construction Bank of the Ministry of Finance, which disburses investment funds.

As long as the enterprise is functioning successfully, the watchdogs of the central authorities permit the director legal elbow-room. Thus, if he needs to "borrow" one percent of next month's expected output to reach this month's plan goal no one is likely to object to his reporting the plan as fulfilled. But this borrowed production must be made up in the next accounting period by subtraction from the then current production. If the director continues to fall behind, one or another of the enterprise watchdogs will denounce him to the higher authorities and receive credit for uncovering the "scandal."

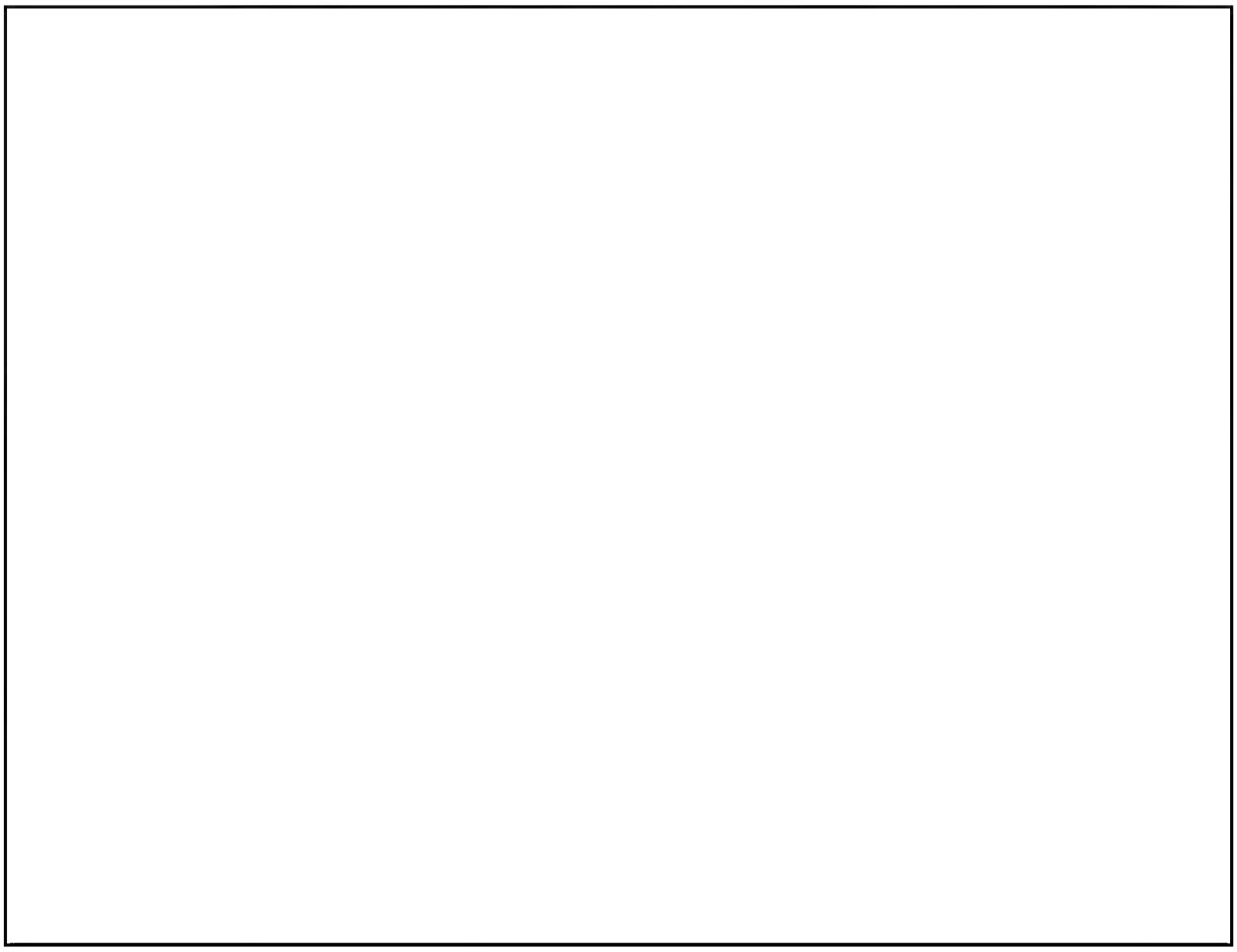
The system, as it is reported by hundreds of Soviet refugees to operate in practice, thus lets only marginal and discontinuous manipulation of output data go unpunished. The error introduced into Soviet production figures by such distortions, one would then conclude, is in all likelihood too small to interfere with their usefulness.

Intelligence Verifications

We in intelligence have further means to check the reasonableness of individual enterprise reports. Military and civilian embassy officials have been engaged in observational reporting from iron curtain countries for many years.

25X1B

25X1B

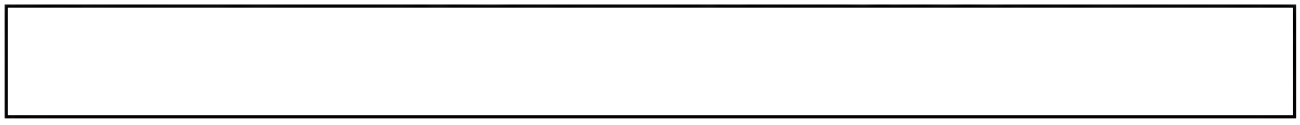


Agricultural Enterprise

Special mention should be made of particular problems which affect the collection of agricultural statistics. First of all, there is the problem of the competence of the rural collector. Despite the sweeping claims made for Soviet education, only 40 percent of the adult population in 1959 had had eight years of schooling, and the proportion in the rural areas was undoubtedly lower than this nation-wide average. The quality of Soviet agricultural statistics has suffered from the consequent lack of adequate training given the collectors.

Secondly, the typical peasant expertise at ochkovtiratel'stvo--throwing dust in the eyes--had developed to a fine art in response to the challenge

25X1A



of the Tsar's tax collectors. That it continued to be practiced long after the Communist take-over was shown by the 1951 Soviet decree that no report of a collective farm claiming the death of an animal from natural causes would be accepted without a veterinary's corroboration.

Through most of the years of the Soviet regime, the final authority for estimating crop production lay with the Office of the Chief Inspector for Estimating Crop Yields, attached to the Council of Ministers. This office relied on a staff of local agents to inspect reports and used historical correlations of weather conditions with crop yields to check the validity of local reports and determine output. It is interesting that U.S. intelligence officers now use this same technique to judge the reasonableness of official Soviet claims for agricultural crop production. Agricultural output statistics are still regarded as generally less reliable than industrial production data, and the agricultural delegations which have gone to the USSR under the exchange program have provided few, if any, checks on the published figures.

There are, however, a number of current developments favorable to improved agricultural reporting, to wit:

The rapidly increasing size and decreasing numbers of collective farms--from 250,000 in 1950 to about 55,000 in 1959--must be resulting in the assignment of better qualified personnel to prepare statistical reports.

The increasing percentage of agricultural output given food-industry processing before going to consumers requires that the center receive relatively accurate data in order to plan for the food processing plants.

The progressive substitution of money wages for payments in kind to labor will reduce independent marketing of collective farm produce, putting more of it under state control and facilitating the spread of economic accountability.

Integrity at the Center

We can move now from the origination of statistics at the farm or factory to their collation and publication at the center. Statistics are an essential operating tool for an economy that relies on allocation rather than a market price system as its controlling mechanism. Lenin's decree of 1918 set up the first Soviet statistical organization, and an industrial census was taken the same year. Since 1948 the Central Statistical Administration has been an independent agency reporting to the Council of Ministers, with jurisdiction over reporting forms and authority to check on the accuracy of reports received from subordinate echelons.

The CSA runs its own schools for training accountants and statisticians, writes textbooks, and develops calculating machinery. It receives quantities of reports covering quarterly, monthly, ten-day, and, if the subject is important enough, even daily results.

The reports that CSA receives must be reasonably accurate if the central system of allocations is to work. Despite cut-backs, from 700 to 800 commodities were still reported under centralized distribution in 1959, including the most important ferrous and non-ferrous metals, fuels, chemicals, and machinery. The question of the integrity of the CSA statistics is thus reduced to whether it publishes total production figures unrelated to the sum of the plant production figures it receives. In other words, does it keep two sets of books, one for the internal operation of the economy, and another to throw dust in Western eyes?

Our most comprehensive check on centralized reporting became available at the close of World War II. The German Army, in its penetration of the USSR, had captured a 750-page statistical document carrying the official Soviet security classification Not for Publication and entitled "State Plan for the Development of the National Economy of the USSR in 1941." This document was recovered from the Germans by U.S. intelligence personnel, and the data contained in it were compared with openly published statistics, particularly those given at the 18th Party Congress. It was found that the openly published data were identical, except for minor discrepancies that could be accounted for, with those in the classified document intended for the official use of Soviet planners.

It should also be remembered that Soviet officials need not falsify data to keep the West uninformed. The USSR can easily withhold information either for security reasons or because it would reflect unfavorably on the regime. Since the Communists first came into power they have followed a policy of selective release of data. The controlled release of information, although usually designed to mislead, is conceptually and practically quite different from falsification.

One of the best examples of Soviet manipulation of data for propaganda purposes was in reporting grain production, when they shifted, for the years 1933-1954, from quantity harvested (barn yield) to the larger figures for the size of the crop in the field (biological yield). Although they made no secret of this switch from standard world-wide procedure, some unsuspecting and careless Western writers accepted the biological yield figures without correction for comparison with Western barn yields.

Need for Interpretation

The interpretation of Soviet commodity statistics, in common with those of other countries, depends upon definition of the categories being

measured. Soviet definitions and usage are often different from those commonly accepted in the United States. Some such lack of direct statistical comparability exists, of course, in the economic data of any two countries, but the reconciliation of Western data is usually an easy task because of explanatory notes appended or explanations available in convenient source books.

Such is not the case in the USSR. Often terms are not explicitly defined, and their meaning must be determined by laborious cross-checking. For these reasons, the statistics released by the Soviet Union must be screened very carefully and not assumed to be comparable to U.S. figures unless so proved by rigorous analysis.

Finally, Soviet aggregate statistics, such as those stating total industrial and agricultural production and national income, whatever merits they may have for internal measurement of progress or external propaganda purposes, cannot be compared with similar measures of total economic activity released by Western nations. The conceptual differences between East and West are too great. For example, the Soviet definition of national income is one of physical production, excluding most of the governmental, professional, and domestic services included in Western income definitions. Variant methods of pricing manufactured products probably introduce another area of noncomparability.

The Soviets have released enough data on physical production, however, to enable us, by augmenting it with additional commodity figures obtained through intelligence research, to compute reasonably satisfactory indexes of both industrial production and national income in terms of Western concepts. These computations will remain a necessity: no matter how liberal the data disclosures of the Soviet leadership in the future, it is unlikely that they will supply us with computations of aggregate indexes based on non-Marxist definitions.

We can be reasonably sure that economic data presented by the Soviet Union will continue to have both meaning and significance. The major research problem will remain in the future what it has been in the past--to find out just what this meaning and significance is.

SHEPHERDING A SOVIET TOUR *

25X1A [redacted]

The main job of the interpreter accompanying a Soviet delegation around this country is to facilitate communication. He should not be so loaded with other assignments that he reaches the point of exhaustion in which, as a Soviet interpreter once put it, he feels like a wise dog--he understands everything but cannot say a word. Yet if he keeps it a secondary function he can elicit, and help in the elicitation of, useful information, a good deal more these days than in the first years of the exchange program. *** Sometimes he stumbles on it; sometimes he works for it and succeeds, sometimes fails. And exceptionally he may be deluged with more than he can absorb. How he goes about it can most easily be shown by holding up some pages from his life.

Paducah

As I near the top of the temporary ladder leading to the second floor of the new Paducah city hall, open to the sky during construction, the December fog from the Ohio river is so thick that I cannot see whether the two missing members of the Soviet delegation are there. Twisting around on the top rung, I now spot the two ghostly figures at the far end of the building--and simultaneously slip and nearly tumble. I picture the headline in the Paducah paper: "State Department Interpreter Breaks Leg in Fall: [redacted] who accompanied the Soviet delegation of 12 construction specialists to dams and construction sites around Paducah, is said to be in satisfactory condition after . . ." 25X1A

The slip is a warning that I am overanxious. The reason for my eagerness is that these two Soviets, the most communicative of the

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* Studies in Intelligence, Vol. 9, No. 2 (Spring 1965), pp. 1-14.

25X1A [redacted]

25X1A *** Cf. [redacted] 25X1A
, p. 21 ff.

12, for the moment are alone. All week the head of the delegation, Andrei Schepetyev, has blocked my every move to talk to them without his supervision. Here is my chance. As I approach them amid the pipes, conduits, and construction debris, I can tell from their stance and dramatic gestures that their conversation is of the heart-to-heart kind. Now I can hear it.

Pravilno, pravilno! Girenko is agreeing with something. The big man of magnetic personality is head of some 400,000 construction workers in the South Ural economic district, a gold-starred Hero of the Soviet Union, and a delegate to the Supreme Soviet.

"I told them, I wrote them; but it did no good," protests Denyega, an idealistic, obstinate, and bitter Ukrainian whose job is to coordinate the production of construction machinery throughout the USSR. He is thirty-seven but looks fifty. The head of the delegation appears to hate him.

From the commodious pockets of my trenchcoat, from among the neosynephrine, aspirin, cough drops, and indigestion pills there, I take a small box of chocolates which were to have been my breakfast (try ordering for a dozen hungry Russians in Paducah when they want real Central Asian kefir and won't settle for buttermilk or even yogurt) and hold it out to them. "Chocolates, Pavel Gavrilovich, Andrei Yermolayevich?" With an automatic spasibo they munch the candy and continue talking. Denyega, I learn, has written a report in which he is going to take on the entire Gosstroy chain of command and doesn't care what happens.

Drug moi, proshu vas ochen--ne goryachites. Like an old coach calming down his star player, Girenko in his velvety basso tells his friend not to get excited and act rashly because he will only hurt himself. Denyega gives a frustrated kick at an imaginary impediment, then reluctantly concedes, "You are right. But how long do we have to wait? It is not for me. It is for the good of all."

"You can be sure," answers Girenko with great power of persuasion in his voice, "that soon there will be changes. Enormous changes. Life demands it. But right now be calm and do not criticize them."

"Them," I think, the insiders, the politicos. I interrupt. "I am glad I found you. Shepetyev worries when you are missing."

"Let him. We are not children," says Denyega, just as I expected.

"May I ask you, is this building of interest to you? It is old-style custom construction, monumental type. The last delegation from Gosstroy that I had was only interested in mass production methods, prefabricated parts and all that."

"That's absolutely wrong," says Denyega, and Girenko nods. "If our responsible people were not so blinded by dogmatics, they would learn much here--they would see our weaknesses."

"What do you mean?"

"Rhythm, Ivan Antonovich. Rhythm."

I am puzzled, and both smile at me. "Better speak Russian, not construction jargon," suggests Girenko, lighting another Russian long cigarette.

"Look!" Denyega paints his dream, "The second floor is put on top of the first with all the electrical conduits and outlets, all the pipes already in place. The building emerges from the ground a logical organic whole--like a squash coming up from the earth. The carpenters, masons, electricians, assistants, truckers all work in rhythm doing the right thing at the right time--like players in a symphony, like our great Moscow orchestra under Kondrashin. Have you heard him? Now do you understand?"

I say I do but I already knew that some buildings were quickly assembled in the USSR out of prefabricated parts. What's wrong?

Again they smile at my naivete. "True we put a building together. But it is only the shell. Then come the pipefitters and poke it full of holes. Then the electricians and make more holes, then the plumbers who usually flood it for you," explains Denyega.

"And chip off all the plaster!" breaks in Girenko. "So before your customer will sign the acceptance you practically have to refinish the whole building, and then explain the delay to the bank and a myriad of supervisors. Oh, Ivan Antonovich, you have no idea what unpleasant negotiations one has to carry on! You know I have an ulcer, don't you?"

"Not only buildings; even roads. Remember the road?" asks Denyega, beginning to laugh.

"Yes, the road!" roars Girenko, and then the two of them, interrupting each other and doubling over with laughter, gasp out the story of how 500 kilometers of a highway Girenko had just built were torn up so that telegraph wires could be placed under it.

I realize that I am witnessing a rare moment of purgation--accumulated frustration suddenly expressing itself in near-hysteria. I play along.

"I understand that under your system each enterprise makes its own plans and sends them to Gosplan for approval. What goes wrong?"

"Gosplan--those mother-rapers!" explodes Denyega.

"Our cross and crown of thorns," says Girenko, rolling his eyes to the foggy sky.

"We in Washington are accustomed to thinking of them as top experts surrounded with computers, etc. Are we mistaken?"

"Partly. They have good engineers, good staff. But key decisions are often made by unqualified people at the top. Overall planning devitalizes the individual building organizations. Here your contractors do what common sense tells them. We frequently can not. That is our grief. It is not your factories and engineers that impress me," continues Denyega. "Man for man, plant for plant, we are as good as you are. But in system of management--here you have something we should take lessons in."

"Ach, we know all this," Girenko says. "We didn't have to come to America to see the changes that are needed. Life demands them. Life teaches us. It is just a question of time, we will make them. And then, mark my words, we will catch up with you."

At this juncture the head of the delegation comes climbing up and slips on the same rung I did. It does not improve his humor. "Well, have you found anything useful?" he asks Denyega and Girenko.

"Not very much . . ."

"Then why waste time?"

"Well, not utter waste. Note here--they use stamped pipe clamps. We still cast them. It is cheaper their way," says Denyega.

"Aha, Aha!" Shepetyev is pleased and tells the secretary, Kazarinov, always at his elbow, to note the name and location of the factory that makes this minor item. "Now please, Ivan Antonovich, do stay at my side," he turns to me. "My colleagues need you. What were you discussing here so long?"

"The delegates very kindly explained some facts about building planning that confused me."

"Later, later, I will personally explain and answer all your questions. They are not specialists in this field and should not try to educate

you. I am the specialist. I will talk to you later. But right now please work with me. Every minute is valuable. This trip is very expensive and we are not rich like you. Shall we go?"

Some Notes and Thoughts

At the airport I quickly make notes on the conversation, and then I test my recall from brief notes I took about a week ago on another incident involving Denyega.

My notes, like those of most interpreters trained by the State Department, are based on the principle of Egyptian ideographs with a few key words, letters, or symbols added. In the twinkling of an eye a whole idea or incident can thus be recorded. This method releases the interpreter's attention for listening and comprehending. Of course it takes practice. The principles of interpreting impressed on us in the instruction are the following:

Learn to listen; subordinate yourself. Listen for the ideas, to what the man is selling, not what he is saying. Interpret the man's ideas rather than his words whenever possible. Make your notes suggestive, to stimulate your memory. These personal reminders will also be secure.

Now I am pleased that I seem to recall fully the week-old incident from just a few ideographs and words and can compare it with what just happened at Paducah city hall. Here is how it goes.

The letter L and the symbols 3/12, yd. tell me that on 3 December 1963 we were at the Lorain factory near Cleveland which makes cranes, and the incident took place in the yard. A crudely drawn fish skeleton and the words Loch Ness, tubular, 250' welded remind me that we were looking at a tower of a crane 250 feet high made of welded tubular steel instead of the usual riveted flat members. It therefore had unusual lightness and strength. And it did look to me like the skeleton of a Loch Ness Monster.

The letters D, K, O, and the word Gosplan with a line through it mean that Denyega, Kazarinov, and an engineer named Ozerov who builds cranes assured me they knew of such crane construction and wanted to build some, but Gosplan objected. Or, rather, it upheld the steel industry, which did not want to have to make a special small production run for the tubing.

Uralmash=Henry Ford "T" tells how, when I asked the engineers why they could not place an order with say the famous Uralmash, they replied that this wealthy combine, with its own sanatoria and a huge director's fund

from which special bonuses can be given its employees, is slow to change models and so makes a lot of money but produces machinery they considered obsolete. I thought of Henry Ford clinging to his Model T and making quite a few millions by not changing.

The last symbol is a book with the letter K. This is my observation that Kazarinov, the secretary, who at home is a senior engineer at Gosstroy and tests all the foreign machinery for it (to compare it with the Soviet, he says)--this Kazarinov, with a face like Shostakovich and as tall and lean as an Olympic track star, is a fabulous note-taker. Looking over his shoulder I see that he too uses symbols and ideographs, and he is a marvelous sketcher. When he cannot take pictures (as he does by the hundreds) or get photos or drawings from the plant, he takes notes in order to make sketches later. "The design of this connector is so interesting," he confides with a happy smile.

I bet he will have an almost 100-percent recall of every plant layout, dam site, and construction project we visited, as well as design features of new machinery. But I note that the Americans shy away from telling him everything. Usually they hold back about steel specifications. Maybe this is one reason the Soviets still have to buy U.S. technical data and know-how.

St. Louis

Six months later, in the summer of 1964, I am in St. Louis with another delegation. A high-powered one, it includes: Novikov, head of Gosstroy and deputy to Khrushchev in the Council of Ministers; Neporozhny, top man on electrification and builder of the Aswan Dam, just back from a visit to Egypt with Khrushchev; several Ministers of Construction from large republics; Petya Chernyshev, builder of the largest turbines for electric generators and a recent Hero of the Soviet Union. The last is a pudgy, nervous, pleasant young man who speaks in snatches. His hands testify that he did indeed start his career as a lathe operator at the plant where he is now the principal engineer.

I no sooner step into the hotel than I am told to call a number in Washington "no matter what the time is." I recognize the number as that of my backstop, Sean. I cannot make the call until 2:30 A.M. Reason: his most communistic majesty Ignaty Trofimovich Novikov chooses to have tantrums and summons me and the tour manager to his suite and bawls us out because no crowds, no VIP's, no press and photographers met him at the airport. He had wanted to make a speech on Soviet-USA friendship there at eleven o'clock at night in a pouring rain. We express anguish at his displeasure, promise to phone Washington, and hope to do better in the future. Thanks to Neporozhny we are dismissed with a conciliatory pat on the back and a tumbler of Ukrainian vodka aptly called Gorilka, the Burner.

Then I get Sean out of bed and get the news, which is good. The host company has been briefed by [redacted] and is cooperating fully in the effort to get answers to intelligence questions. A young engineer named Joe is the key man, and I should work with him. I have seen the questions, and they are good. They are clear, logical, and not probing sensitive matters about which a delegate cannot tactfully be asked. Enough background is given for the questioner to understand the problem. Petya (the Turbine) Chernyshev is the main target. 25X1A

The next morning finds me working without a break. Since the tour began, ten days ago, I have not asked a single question; but I have bought technical books * and periodicals as gifts, have given Neporozhny a plastic raincoat, have made some useful suggestions from prior experience in some of the areas visited--in short, I have put the Soviets under obligation to me. I have helped them and they know it.

I spot Joe easily. He is a smart young engineer, a turbine specialist. He and Petya enjoy talking to each other through me. But there never is an opportunity for them really to get together. The next day is the same. The third day it rains, and I am getting desperate. Nonetheless a part of the group goes out to a power plant under construction, puts on rubber boots, and sloshes through the foot-deep mud at the site.

As we start back Joe and I make our move. Joe says he wants Petya to ride with us. Petya is most agreeable, for he has questions on the huge new turbine he has seen. But the other Soviets raise a cry as if Petya is being kidnapped, and the Americans not in on the game side with them. Shortly everybody is hopping in and out of cars--a Mack Sennett comedy in the mud. I am getting dirty looks from everybody. Petya ignores them and gets into the car next to Joe, who is at the wheel. I get in and shut the door and we drive off. The others follow, then overtake us as we slow down for conversation.

Petya wants to know why the compressor is located where it is on the new turbine. A tough question, but Petya sketches the turbine and Joe explains why. Petya understands, takes notes, and begins to look like the cat that swallowed the canary. Then Joe asks him questions about <u>his</u> turbine and his problems with it. I suggest that he sketch it, pleading the very real difficulty of interpreting

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* Soviets were particularly interested in the "critical path method" of programming construction.

technical descriptions. Petya does; and presto he shows its configuration, its size, the steam flow, and many other characteristics--everything we wanted to know.

Joe takes the sketch while driving. He glances at it, points to the exhaust, and says, "Tell him, John, there's where his trouble is." Petya turns beet-colored and bursts out with something incomprehensible, showering my face with saliva. Then he chokes with laughter as he wipes my face with his hand in a friendly Soviet way--"Tell him that I have trouble here too," and he points to the last section where the blades are longest. He says Joe is real bright and pats his shoulder. Joe says Petya is real bright and pats him back. He says both Westinghouse and General Electric had trouble in exactly these same spots when they were in the design stage. Petya asks about steels, and Joe tells him something but seems unable to recall the full answer.

Suddenly Joe honks madly. The lead car has forgotten to make a turn. Joe makes the turn, and soon we are driving along the Mississippi without the other car. Joe asks if Petya would like a ride to see another plant with an interesting water intake. Would he? Why it's the river of Mark Twain. He has read "Life on the Mississippi." So another hour of talk about turbines. The two promise to write to each other; Joe will send Petya some steel specifications when he finds them.

When we arrive at the hotel Novikov's personal secretary is standing at the entrance, angry and impatient. He demands what Petya was doing for such a long time. Petya pats the pocket where his notebook is with a happy expression and says he was learning things about turbines and viewing the Mississippi. "And how was it?" asks the secretary. "Wet," says Petya, and walks away.

Joe and I compare notes. He reveals he was the one that made the wrong turn--on purpose. He agrees to write a report for Washington. Petya is at least three--maybe four--years behind us, he says. But he is bright. If he knew English he would recommend the Company hire him. "He's no competition now, but he will be."

Schenectady

Although the people who work and live in Schenectady call it an ugly and dull company town, I found it a cool, immaculately kept little city, set in an emerald valley and having wide boulevards, magnificent factories, and a lovely old section of colonial homes with large neat lawns and flowering shrubs that have Georgetown in D.C. beat all hollow. Furthermore, Neporozhny, his secretary, and Petya (the Turbine) Chernyshev, who were there with me on the closing days of their tour, agreed with me wholeheartedly.

When the tour of the factories was over we walked through this colonial section, and the Soviets daydreamed like kids, picking out which house they would like to live in. They praised Schenectady and the American engineers and managers and labor and General Electric and the whole United States. Schenectady and the Hudson river valley is just like countryside in the vicinity of Kiev, they said, admitting they were getting homesick.

Maybe Schenectady looked so good because all of us were happy, the Soviets with what they had learned and I with the facts I had gathered. For after St. Louis, and particularly after Los Angeles, mid-way in the tour--after I had taken care of Neporozhny when he fell ill and got him gratis a miracle-working doctor who had him back on his feet in one day--the tour became for me virtually a moveable feast of facts and interpretations. My main frustration was inability to absorb all of the particulars and details that were thrust upon me from all sides; it is my practice not to take notes during such conversations. Consider the following:

Item one. The Minister of Construction from Kazakhstan, shaken by the colossal irrigation and flood-control works in southern California, began to tell me all about his irrigation scheme. The Minister from the Ukraine said his was much bigger, and both started reeling off names and details concerning the crash program that seems to be under way in the USSR. Neporozhny, with a mischievous twinkle in his eye, said the program was drawn up personally by his friend Nikita Khrushchev, who sequestered himself a whole month at his dacha after the disastrous crop failure, helped by only one expert.

Item two. Neporozhny revealed to a host (who I could tell had been well briefed intelligence-wise) his problem with costs in electric power production, how they seem to be twice the average in the United States, and how all the turbines in the world will not lower them significantly as long as Gosplan makes the electric industry use the worst coal in the RSFSR so it can give the best to the chemical and steel industries. "Right now the chemists in the Soviet Union are Czar and God," he said. "I am having to use my cadres on building twenty factories for them."

Item three. At the amazing Enrico Fermi atomic plant in Detroit, again in Boston at an experimental plant that generates electricity directly from burning gases, and again in Schenectady the Soviet electric power specialists made no secret of their philosophy for expansion of the industry, their troubles with a long-range transmission system which they had been boosting for sale to the United States, the high cost of atomic fuel in the Soviet Union, apparently precluding large-scale commercial use until a fast breeder reactor is perfected, and their troubles with bursting boilers, symptomatic

of the general stand-still in electrical engineering until there is a breakthrough in metallurgy. The American hosts agreed they had similar troubles; electricity knows no politics. But everywhere in this area we seem to be ahead, sometimes by a nose and sometimes by several lengths.

Item four. On one long flight I opened a gambit by saying I had not yet met a delegation that liked Gosplan. The delegates laughingly agreed and told the following story:

"We understand that the mythical figure Jesus Christ once worked an utterly improbable miracle; he fed the multitudes with five loaves and two fishes. Well, it might have been possible after all. He did not have the Gosplan allocating his material resources."

Then, referring to speeches of Novikov, I asked his secretary if Novikov was satisfied that he could bring about with his existing authority and organization the programmed improvements in the construction industry. "No," was the reply, "he has asked the Council of Ministers for some added powers, which Gosplan, headed by Lomako, now has."

For the next several hours, five miles up in the sky, I was afforded insight into the workings of the minds of the top Soviet echelon as the various Ministers dropped in on this bull session. They complained that insufficient funds are allocated for planning and supervision. "The difference between us and the Americans," said the six-foot-seven Minister from the Ukraine, "is that here they think before they start construction, and we afterwards." Even Novikov joined the party to remark that Ministers should merely execute orders while others--more intelligent people--do the thinking for them.

Last Flight

Mulling all this over at the Schenectady airport, I decide I should make one more try, for the answer to a question a colleague has asked about Soviet organization. So another gambit. I give Neporozhny a handbook I have promised him--Annual Indicators of the USSR, published by the Joint Economic Committee of Congress in February 1964. It is my personal copy and shows the use. Neporozhny is grateful. Since he can read some English he is at once so absorbed in it that I begin to regret giving it to him.

"Aha, aha," he mutters. "See how much bigger you are than we. What is all this devilishness Lomako has been telling me! Wait till I shove this at him. Oh I will shove it hard."

I ask if it is possible that a person of his rank has trouble getting original foreign statistical data. Surely the Soviet embassy in Washington would send him a copy. Looking away, he says matter-of-factly, "Shameful as it is to admit, this is one of the hangovers from the Stalinist period we have not yet eliminated. Our government organizations do not exchange information freely--lateral dissemination of economic data is frowned upon. There is a prejudice against asking for it unless it is directly related to your job; and occupying the position I do, I am supposed to set an example for others."

Boarding the airplane, I ask to be seated next to Neporozhny. He is still studying the handbook with shifting expressions of satisfaction and dissatisfaction. I pull out of my briefcase a new, still uncatalogued Soviet book on organization of economic management and open it to a place my colleague had marked. Here is indicated a new organization, and one of great importance, for it stands squarely between the Council of Ministers, which runs the economic life of the Soviet Union, and the four pillars of planning and management--Gosplan (Lomako), the Councils of National Economy (Dimshyts), Gosstroy (Novikov), and the several specialized State Production Committees (headed by men like Neporozhny). This new body is headed by Ustinov and called the USSR Supreme Council of National Economy. Its function is not at all explained by the tiny paragraph devoted to it.

I ask Neporozhny what this organization does and does he know Ustinov. I tell him how hard it is for me to make intelligent translations because of a lack of clarity in some Soviet publications, of which this is a good example. His answer is simple; it is a kind of appeals board for conflicts which can be resolved on a technical basis without modification of basic directives. The Council of Ministers did not want to be bothered with questions which experts could settle.

I note that the new Council has specialists for defense on its staff and pry further--for it is suspected that it also coordinates economic activity with defense requirements. What kind of experts does Ustinov have? Neporozhny says Ustinov's staff is small but he calls in experts as needed. What kind, I ask.

The now familiar twinkle comes into Neporozhny's intense blue eyes. "Preference is given to ex-wrestlers," he says. "They grab the ministers by the scruff of the neck and seat of the pants, catch-as-catch-can fashion, and pull them off each other. For Ustinov is a small man and not very strong. Against a man like Novikov, who is a former coal miner, he wouldn't have a chance!"

Checkmate. I know when I'm licked and put the book away. I make a few notes, openly this time. Neporozhny continues to answer questions and talk freely on other problems of economic organization and management--

industrial consolidation, capital formation, labor productivity, and its scarcity under the new priority for agriculture. When I ask how a central planning system can compensate for the lack of the built-in incentives to cut costs in a competitive system, he says, "Since you raise this question, you are the person best qualified to answer it. Come to Moscow and we will give you all the information needed for a comparative study."

"Do you think it would be useful?"

"I think," says Neporozhny, "the more meaningful fact is the suitability of a system to a people at their present stage of development. At one time your ststem gave you very rapid growth. Your mastery of technology is beyond what I imagined it to be; yet your growth has slowed down. Clearly something is wrong if, having such fine cadres of labor and engineers, such abundance of resources, and such a God-sent climate, you are not working at your highest potential. We are. Our growth is more rapid than yours. So Communism is in our blood and there can be no hint of a return to the past."

I explain that I was not thinking of that, but of the capacity of their system to evolve, as ours has also evolved. "Yes, we change," he replies. "So long as new ideas do not conflict with basic Marxism and dialectical materialism, we adapt them for our use. Notice I say adapt; we do not copy. Neither machinery nor ideas do we copy. All require adaptation before being incorporated in our system."

Neporozhny, who had been a professor of electrical engineering with many published works, says he became an industrialist when, under Khrushchev's reforms of 1957, a decision was made to have the economic life of the country run not by politicians but by top specialists. I ask if Novikov is a PhD. Again sparks fly from Neporozhny's eyes and he cannot resist a witticism. "He is a political engineer," he says, leaving me to ponder the double meaning while his colleagues turn red.

Net Evaluation

The tour is over. At the Kennedy airport, as the delegation prepares to emplane, Novikov gets off his last speech before a few Americans, including the official State Department host. Compared with his initial speech a month ago, this shows him a changed man. He is more relaxed, far more thoughtful. The strident, self-confident style of the udarnik, the shock worker is mercifully gone. He speaks of the usefulness of the tour, simply, with dignity and sincerity. He asks the Americans to come and visit the USSR, where they too may learn something. His talk of peace and friendship does not sound like

propaganda. The dapper Ambassador Fedorenko, delegate to the UN, trembling in the presence of Novikov, translates his speech. He falters and I have the satisfaction of prompting him.

Later I shall see that Novikov gave a favorable and fair interview to Pravda on his return to Moscow. The main nonintelligence objective of the tour, its one really big purpose, has been accomplished: even a tough, doctrinaire Communist like Novikov has been deeply impressed by the United States. And this is the usual pattern for every delegation I have accompanied. At first impatience, braggadocio, suspicion, and unreasonable demands. Then the big thaw and a period of good feeling. Then the thoughtful, quiet parting, the warmth of a month's comradeship dissipated as the Soviets make ready to be whisked back into their perilous, rigid world.

What impressed them? Not only, I hope, our industrial might, roads, cars, real wages. I hope it is our people and their attitude towards life: the semi-employed workman speaking without embarrassment to a Minister about his car, his mortgage, his union benefits, his sons in school or in the army; the lovely air hostess who quickly learns enough Russian to offer them kofe ili chai; the soft-spoken colored porter who graciously refuses their tip; the earnest college students poring over books in the library.

As for the intelligence objective, the interpreter is greatly aided if there is no break in the question chain that originates with the specialists in Washington and ends with a cooperative host. The latter is in by far the best position to ask questions at the usual meeting winding up a plant visit. To the Soviets it seems only fair that reasonable questions should be put to them by Americans engaged in the same line of work. This then gives the interpreter an opening to follow up with more questions and develop the topic more fully. It is quite difficult--sometimes, with a hostile delegation, utterly impossible--for an interpreter to start the questions on his own.

Aside from factual information there is need for interpretive insight into what stands behind it. The integral meaning of what lies openly before us is probably one of the more important problems in Soviet studies today, and the interpreter who lives for a month with a Soviet group, is in a good position to achieve some insight into deeper meanings.

GUNS OR BUTTER PROBLEMS OF THE COLD WAR *

25X1A [redacted]

When a Roman commander in 50 B.C. took the men and materials to throw up a fortress wall or build a new catapult, no one balanced this against civilian use of the resources. Defense was paramount. But no organization man in Washington or Moscow today would think of ordering a strategic weapon system without inquiring, among other things, into its impact on the economy. In this nuclear age both weapons and organization have become so complex, even in peacetime, that men must now study carefully the economic result of every major armaments decision. The questions asked may range from the industrial implications, here and in the USSR, of disarmament proposals on the one hand to the effects for the Russian consumer if Moscow matches a Washington decision to install an expensive antimissile system on the other. This article will explore the contribution of economic analysis in studying the impact of alternative military programs and will point out some of the intelligence problems involved in doing it on the USSR.

Economists recognize that in a global context the major considerations relative to disarmament or increased armament are not economic. Maintaining a counterpoise to the adversary in military strength and political initiatives will continue to be the overriding objective over the next decade. The economic problems will increase in importance only if the political and military problems come nearer to solution. But analysis of the economic impact of alternative defense budgets may help us understand the implications of military and political developments as they occur.

It is the cost of modern armaments and the stretch-out in development of new military hardware that make it necessary to consider the economic impact of defense. The world now spends about $135 billion annually on the war industry, roughly as much as the entire

* Studies in Intelligence, Vol. 9, No. 4 (Fall 1965), pp. 1-11.

25X1A [redacted]

income of the poorer half of mankind. The United States spends a little more than a third of the total, the USSR about a third, and the rest of the world a little less than a third. There are many competing demands for the resources represented by this money, for example increases in personal consumption, more investment to accelerate economic growth, war on poverty, expansion of higher education, more aid to developing countries. Moreover, decisions on arms spending made today cannot easily be changed tomorrow by beating the swords into plowshares. The Pentagon's shopping list has few items in common with the housewife's, and military hardware ordered two or three years ahead cannot be converted to patios or cabin cruisers. That is why a new military order, usually expensive and highly specialized, will affect other claimants to the nation's output for several years to come.

What is needed for studying the economic impact of defense is a technique that will translate military spending into civilian spending and vice-versa, so as to forecast the effect on the structure and growth of all civilian sectors as the resources available to them are increased or decreased. One must take into account: (1) the quality as well as the quantity of resources left for the civilian economy (a GI mustered back to an Iowa farm will not contribute as much to technological progress as an engineer released from the Redstone arsenal to AT&T); (2) the regional impact of defense spending, particularly with respect to small cities where the phasing out of a weapons system may close an assembly plant, for example; (3) the speed of military-civilian conversions, which may aggravate the frictions developed in switching resources from production of household appliances, say, to marine turbines; (4) the differences in national abilities to adjust, recognizing that a taut and muscle-bound economy like the USSR's will not as readily absorb increased defense outlays as one with some unused resources and the tremendous flexibility of the American. Economists have not yet developed standard techniques with which to attack this many-faceted task, indeed have done very little pioneering work on it.

A Hypothetical Case: The Problems

Military planning today requires some notion of the possible size and structure of the enemy's forces ten years from now and of its economic capability to support them. Suppose one were speculating about the size of Soviet defense outlays through 1975, necessarily making assumptions about many things such as technological breakthroughs and the shifting winds of coexistence. With the USSR's current defense spending at about $45 billion, a plausible range of alternative budgets over the next decade might be from a low of $35 billion to a high of $75 billion (reflecting, perhaps, a great

difference in the magnitude and sophistication of strategic forces). With this frame of reference established, the economic impact problems begin.

First, would the $40 billion difference between the high and the low, if Moscow chose the latter, buy $40 billion worth of Russian consumption, or foreign aid, or investment in economic growth? Not necessarily. It might yield more (or less) than $40 billion in additional consumption, less (or more) than $40 billion in new investment, or some indeterminate addition to foreign aid. One of the riddles that research on the Soviet economy has not yet solved and must devote more attention to is the "exchange rate" between military and other spending.

This problem illustrates a fundamental difference between the U.S. and Soviet economies. In the United States a dollar is a dollar whether spent on military R&D or new housing, and our price system reflects the spending of economic resources in a way that accords with our national and individual desires. Through the price system people vote for the goods they want, and investors plan their output in line with these price votes--a very efficient arrangement. But in the USSR a ruble is not a ruble, because prices are set by Moscow without reference to consumer votes. If more resources are needed for military R&D, the Soviet price system does not determine which sector of the civilian economy will give up these resources. The decision is part of the economic plan, and the resulting shift in resources may be quite inefficient. Thus it is difficult to determine whether a ruble taken from housing will buy a ruble of military R&D.

Second, would Soviet GNP grow at the same rate under the high and the low military budgets? That depends on the quantity and quality of men and materials left for the civilian sector and on how Moscow divides them between investment and consumption. The quantity problem by itself is easily interpreted--sum up all the men and the metal and the electronics gear ticketed for defense, and those resources are lost to the civilian economy. The quality problem is more difficult--the kinds of men and metal preempted by defense will affect the rate of technological development and hence the rate of growth in the civilian economy.

A high defense budget that concentrated specialized resources on military research, development, production, and space activities would interfere seriously with the introduction of new techniques in civilian industry. For example, if a disproportionate share of high-grade scientists and engineers are shunted to defense for several years, progress in developing new chemical processes and automation may be greatly retarded. Economists would say that

growth in "factor productivity"--the productivity of labor and capital, measured by the ratio of GNP to the input of the two combined--has slowed down because of pressing military needs.

A question quite apart from the character of the military bite on resources is how Moscow will use those that are left, whether to increase (or decrease) the rate of growth of GNP by raising (or lowering) investment. But adding a ruble to investment will subtract a ruble, more or less, from consumption.

A Quantitative Method

The concept of factor productivity is useful in expressing more specifically the impact on the Soviet economy of the $75 billion and $35 billion defense budgets. Historically, during the long period 1928-63, factor productivity in the USSR increased at a rate of 1.5% annually; but during 1950-58, when defense expenditures grew slowly, this rate was accelerated to a little more than 3.0%, and then during 1958-63, when defense expenditures were stepped up, it fell to about 1.0%. This is the empirical basis for the following hypothesis: high defense expenditures preempt critical resources such as R&D and cause a slowdown in the growth of factor productivity. In our hypothetical example the growth in factor productivity might be about 1.0% with the high defense budget and about 2.0% with the low.

The higher rate, of course, permits a faster growth of GNP. But several other factors enter into the projections of GNP under the two defense budgets:

(1) Moscow's decision whether to put primary emphasis in the civilian economy on investment or on personal consumption; if investment is planned to increase 10% annually, the capital stock (plant and equipment) will grow faster than if it increases only 7%, and the faster capital stock grows the faster GNP will grow;

(2) The annual growth in the labor force; this is related to the growth in adult population and is estimated at 1.7%;

(3) The relative shares of labor and capital in GNP; it is estimated that the return to labor in the form of wages and other payments amounts to about 75% of GNP, and the return to capital about 25%.

We are now ready to summarize in a table the possible impact of a high and a low defense budget on Soviet consumption and economic growth over a decade.

TABLE 1

HYPOTHETICAL ANNUAL INCREASES IN GNP AND COMPONENTS, USSR, 1965-75

	AVERAGE ANNUAL RATE OF GROWTH (%)	
	Priority on Economic Growth	Priority on Consumption
Case I--High Military Budget:		
GNP	5.0	4.0
Consumption	-1.0	3.5
New Fixed Investment	10.0	7.0
Military Expenditures	5.5	5.5
Case II--Low Military Budget:		
GNP	6.0	5.0
Consumption	3.5	5.0
New Fixed Investment	10.0	7.0
Military Expenditures	-2.5	-2.5

The general formula is:

GNP growth rate = (factor productivity growth rate) + (labor growth rate) X (labor's share of GNP) + (capital growth rate) X (capital's share of GNP)

Substituting figures for the high military budget and priority on economic growth:

GNP growth = 1.0% + (1.7%) (.75) + (10%) (.25)
= 1.0% + 1.275% + 2.5%
= 4.775%, rounded to 5.0%

When the GNP growth rates have been determined, aggregate GNP can be projected to 1975 for each of the four cases. Military expenditures and investment, as given, can then be subtracted from GNP to derive the only residual--consumption.

From this quantification of economic impact it can be seen that the high defense budget is not compatible with a premium on economic growth; it would result in an annual decline of 1.0% in personal

consumption (about 2% in per capita terms), which would be anathema to the Soviet leaders and their constituents. If Moscow chose the high military budget for a decade, it would probably have to be content with a rather low rate (4%) of growth in GNP, and even then personal consumption would increase more slowly--3.5% annually in aggregate, or about 2.5% per capita--than it has during the past 10 years. If, on the other hand, Moscow considered the low military budget adequate through 1975, it could maintain a substantial growth in GNP (5%) and the large increase of 5% in personal consumption (about 4% per capita), or alternatively it could opt for a higher rate of growth in GNP (6%) and a more modest increase in consumption (3.5%). *

A puzzling question still remains. Would the high military budget put too much strain on the Soviet economy? The new leadership is already stretching resources to the limit in its grandiose plans for expanding agriculture, boosting consumer welfare, keeping abreast of the United States in space, and maintaining the image of a dynamic economy. If Moscow spent $75 billion annually for defense by 1975 it is certain that something else in the economy would have to give. Could the USSR really afford such a high level of military spending? This question economic analysis cannot answer; it can say how much must be sacrificed for a given level of defense, but not whether the sacrifice will be made. What a nation can be persuaded to give up for defense depends on a host of sociological factors, including the nature and seriousness of the threat, the charisma of the leadership, and the cohesiveness of the people. It is a problem for the combined talents of political scientists, sociologists, economists, and other kinds of experts.

The Disarmament Problem

Although disarmament talks have made no dramatic progress, it is wise to think of economic impact along with the disarmament itself. Some of the many forms that an agreement might take are general and complete disarmament, halting the production of nuclear weapons and delivery systems, a ban on research, development, and testing of new weapons, reduction in conventional forces, and annual percentage reduction in over-all defense spending. All of these programs would release men and resources to the civilian economy, but some would be more useful to a particular economy than others. For example, a country with a

* It is emphasized that these figures are purely hypothetical, serving only to illustrate the methodology.

labor shortage might be attracted by the prospect of a reduction in conventional forces that would release manpower, whereas a technology-poor one might prefer a ban on new weapons development in order to free scientists and engineers for industrial research. It would be useful for disarmament negotiators to know which possible proposals would be most attractive to the USSR, or Communist China, because of economic impact.

The impact of disarmament might be likened to that of a shift in popularity from vacations at the beach to private swimming pools in the back yard. Demand for services at Ocean City would go down, whereas demand for cement, excavating equipment, and local labor would go up. There would be a similar shift of men and resources if the Pentagon were to slash its orders for aircraft and the Interior Department let contracts for large new dams. In a modern, developed economy there are dozens of industries that would be involved in the switch from planes to dams. While some industries push the finished planes off their assembly lines, others produce only the engines or the tires or the radar systems, and still others make only the metal or only the sulphuric acid that helps make the metal. Some sell primarily to other industries; some sell most of their output to final consumers. How will each of these interrelated industries be affected if military aircraft production is banned by a disarmament agreement? Would the subsequent shifts in resources affect economic growth and personal consumption? These are the key impact questions.

One way of getting at the answers is through input-output analysis, a technique for tracing the complex adjustments that occur throughout a nation's industrial machine as demand for final products is cut back or increased at one point or another. A large "flow table" is prepared, in which each major industry is listed once as a row and once as a column. The row shows how industry A sells its products to all the industries listed in the columns, and to final consumers in an extra column. The column shows how industry A buys from all the industries listed in the rows, and from the labor market in an extra row. The table thus shows, for example, the total sales of aluminum to the aircraft industry and as pots and pans to households.

Using the Table

Table 2 is a highly simplified example of the basic flow table in input-output analysis. A usable one would have at least 30 columns and rows; in practice it would be likely to have several hundred.

TABLE 2

HYPOTHETICAL INPUT-OUTPUT TABLE
millions of dollars

	PURCHASES BY STEEL	PURCHASES BY COAL	TOTAL INTER-INDUSTRY PURCHASES	PURCHASES BY CONSUMERS	TOTAL OUTPUT
Sales of Steel	20	20	40	25	65
Sales of Coal	30	10	40	10	50
Sales of Labor	10	15	25		25

It is apparent from the table that in producing $25 million of steel for use by final consumers the steel and coal industry used up $40 million of steel. In other words, it takes steel to make steel and coal, and it takes coal and steel to produce coal. If consumer demand for steel and coal should increase by $5 million each, the input-output technique will tell us how much additional steel, coal, and labor will be needed to satisfy both the increase in consumer purchases ($5 million each) and the additional inter-industry purchases ($? million). The procedure is approximately as follows: The flow table is used to derive a coefficient matrix, a table which shows the inputs of steel, coal, and labor required per dollar of steel and coal output. We now ask a computer to invert the coefficient matrix and multiply it by the column showing the increases in consumer demand. The resulting product is the total increase of steel, coal, and labor needed. If a flow table has 200 industries rather than 2, and if we define a calculation as either a multiplication or a division, inversion of the corresponding coefficient matrix requires about 2,500,000 calculations.

If the Pentagon were to cancel its contracts for the F-111, an economist with a set of input-output tables and a digital computer could estimate the resulting changes in every industry affected. There would be a decrease in demand for steel, which in turn would require less sulphuric acid, less iron, less limestone, and less coal. There would be a reduced demand for synthetic fibres and plastics from the chemical industry. The tire industry would demand less rubber and less nylon and rayon. Employment would be

cut at General Dynamics and at some of its subcontractors and suppliers. These are only a few of the ramifications from such a single cut in production of military aircraft. The input-output tables are a tool for tracing the highly intricate chain reaction through the industrial structure and measuring the resulting demands, direct and indirect, on each of the industries.

Aircraft production is a comparatively trivial example. General and complete disarmament would have a substantial impact, releasing perhaps $40 billion in resources annually to both the Soviet and the U.S. economy. Input-output tables would show the kinds and amounts of material and the quantity of labor that would be freed for use in civilian industry. This information, together with regional economic data, would form the basis for planning the alternative uses. In the USSR the government would make all the decisions as to what resources go where and when. But in the United States planners in private industry would bid for the released materials and labor, basing their bids on their estimates of consumer demand; the government would step in only if a geographic region or an industry needed outside help to adjust to the new conditions.

Another use for the input-output tables would be to evaluate the impact of a large increase in military expenditures. They would show the additional effort required by each industry, would point to the kinds of civilian activities that might be cut back, and would help identify bottlenecks.

To construct an input-output table for the USSR would require a great deal more data than is presently available to Western economists, but fortunately the USSR has become interested enough in this technique to develop some large-scale tables of its own. Parts of the tables for the year 1959 were published in 1962. Russian books and journals have referred to nine national and nineteen regional input-output tables that have been constructed or are in preparation. Soviet writers use input-output data widely in their unclassified papers, implying that the tables are circulated in the USSR and that economists are free to use their statistics in detail. Moscow may in time release some of the more extensive tables for other years.

It is clear that Soviet input-output tables would be more useful to economic planners in Moscow than to intelligence analysts in Washington. The planners have to solve the problems, whereas analysts only identify them. Nevertheless, the wealth of information that emanates from an input-output table would help the analyst measure the strains in the Soviet economy caused by increased defense spending or evaluate the impact of resources released through disarmament.

Other Economic Impact Questions

The ready transferability of men and factories from the military to the civilian sector has received relatively little attention. In the event of general disarmament, what amounts and kinds of the material and human inputs to defense could be used in the civilian economy (1) immediately? (2) after modification or retraining? (3) not at all? A number of excellent studies of this problem have been made in the West, * but the few Soviet economists who have written on problems of disarmament substantially understate the difficulties that would likely be encountered in the USSR. ** The costs of transfer would be less in the United States than in the USSR, because our market mechanism will more quickly and efficiently switch resources to products the consumers want. Conversion probably would cause more problems for the Soviet economy and require greater effort than is now recognized in Moscow, and some of our economic intelligence efforts should be directed to the specifics of the consequent dislocations and effects on the development of the economy.

Educational progress has been an important factor, though difficult to quantify, in the rapid economic growth of the USSR. With the increasing complexity of modern weapons, a greater share of the highly trained scientists and engineers in the USSR are now used in defense, and the implications of this for the future development and growth of civilian industry are uncertain. In order to refine his impact studies, the economist needs some information on educational achievement in the USSR, including projections a decade ahead, and a better understanding of the contribution that education makes to economic growth.

Economists often say that defense is a quite separate sector of the economy that drains resources away from other uses. Although prima facie true, this assertion may ignore a possible feedback from defense to the civilian economy. To what extent, if any, does

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* Benoit and Boulding, Disarmament and the Economy, 1963. The Economist Intelligence Unit, The Economic Effects of Disarmament, 1963.

** I. S. Glagolev, Vliyaniye razoruzheniya na ekonomiku (The Economic Impact of Disarmament), 1964. I. S. Glagolev, ed., Ekonomicheskiye problemy razoruzheniya (Economic Problems of Disarmament), 1961.

technological know-how developed specifically for defense benefit the civilian economy? In the United States, military-space technology is often diffused into the civilian sector: e.g., the $\frac{1}{2}$-thousandth-inch aluminum-coated plastic film developed for the ECHO satellite is now used as a reflective insulator for very low temperature vessels; superior printing rolls have been made from the polysulfide rubber developed for cast solid propellants; sintered aluminum oxide ceramic, developed for rocket nozzles, is now used in industry for special check valves and resistor cores. Little is known about interchange of technology in the Soviet economy between the military and civilian sectors; it is probably not as widespread as here. It is an important matter to the economist, however, because the extent to which military R&D filters into the civilian sector will affect his estimate of factor productivity and future growth of Soviet industry.

ECONOMIC OBSERVATIONS AS WAR INDICATORS *

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The Soviet Union, being the only country with enough military capability to constitute a serious threat to U.S. power, is the principal focus in the intelligence effort to give warning of any deliberate all-out attack on this country. Under prevailing conditions as of the mid-1960's, economic intelligence can contribute to this effort in a number of important ways. The USSR has elaborate civil institutions whose main purpose is to facilitate the transition of the economy from peace to war: they provide for stockpiles of all kinds of goods, industrial and agricultural, and maintain the administrative apparatus needed to integrate industrial and transportation facilities into a military effort. The Soviet civil defense program is already extensive and would undoubtedly be augmented in the event of imminent hostilities. Finally, a variety of economic problems would hinder the Soviets from undertaking the kinds of massive action called for by their military doctrine except after a great deal of advance preparation; the transportation system, most notably, operates at close to capacity under normal loads.

It is true, however, that economic intelligence has a diminishing role in today's early warning process. Under conditions that prevailed immediately before World War II, or even the Korean war, logistics were frequently more important than either weapons systems or tactics, and the potential of economic intelligence for strategic warning was correspondingly great. But as such current military concepts as "zero-reaction-time" long-range ballistic missiles with nuclear warheads and "instant-ready" airborne armies approach realities, information on the slow build-up of a logistical base contributes less toward determining whether, or where and when, the technically advanced weapon systems are to be used. It is nevertheless to be expected, since the maintenance of "instant readiness" will be very expensive in this era of rapid technical

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* Studies in Intelligence, Vol. 9, No. 1 (Winter 1965), pp. 1-14.

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advance, that economic intelligence will continue to be useful for strategic early warning.

In the USIB Watch Committee's monitoring of war indicators Communist China, though a poor second to the USSR, remains of considerable concern for a variety of reasons. These reasons include a very large army, a regime which sometimes talks as if it considers war an enjoyable pastime, an inclination toward what Mr. Kent calls the "dramatically wrong decision," * its proximity to the Nationalists' offshore islands and Taiwan itself, its Indian adventure in 1962, and the expectation of its eventually producing nuclear weapon systems. Today, however, it not only lacks modern weapon systems, but the ability of its economy to support a sustained effort by its massive but obsolescent ground force is, at best, in doubt. The achievement of a significant modern military capability will require a large and successful industrial program, one as much concerned with production of basic commodities (e.g. high-grade steels and technically complex chemicals) as with military equipment proper. The economic intelligence officer charged with strategic warning of hostile Chinese action against the United States will be preoccupied with the regime's progress toward such a program for some years to come.

Civil Defense **: the MOG

It could be argued that with present collection capabilities civil defense is the best bet as source for successful strategic warning of Soviet intention to start a big war. Furthermore, it seems probable that the potential for collecting civil defense information of the warning type will improve.

Although the Soviet civil defense program seems to have changed policy several times since the war, and although there are grounds for debate over its exact size and effectiveness, there is no question that it is large; in comparison with those in the West it is enormous, involving

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* Said of the Soviet decision to install strategic missiles on Cuba, Studies VIII 2, p. 15.

** Soviet civil defense has long been a concern of the economic intelligence officer because the present program began as an integral part of the post war reconstruction of the Soviet economy. Today the Ministry of Defense and other institutions are heavily involved in the program, but the role of economic institutions also continues to grow.

millions of people. Whether the current policy calls for urban blast shelters or urban evacuation plus fallout shelters makes no great difference in its value for warning. Either way, the public has to know what it is supposed to do, when to do it, and where to go. The best of security is not likely to conceal even the earliest of the massive public actions that go with the declaration of a "special period" of possible imminent hostilities. Urban evacuation, moreover, presently an integral part of Soviet policy, requires several days.

The program is as complex as it is large, and it appears to stipulate detailed procedures for every part of Soviet society. These details are one of the reasons that it offers good opportunities for the collection of strategic warning information. In Moscow they include such seeming minutiae as relocating to the suburbs fire engines stationed in the central city, removing national treasures (probably including Lenin's body) for safekeeping, preparing for window-by-window blackouts, and probably even making "final disposition" of carnivorous, poisonous, and obstreperous residents of the zoo. So long as persons friendly to the United States can move about in Moscow, we have simple, inexpensive, and reliable collection devices--such as an embassy wife airing the heir--to give us the crucial information on implementation of civil defense procedures. *

A Moscow Observer's Guide, assembled by the National Indications Center, covers the possibilities for simple physical observation at times of crisis. The MOG was used during the Cuban missile crisis, and in retrospect it can be said to have proved a useful tool. One defect in the performance was notable, however: an omincus sign--distribution of gas masks before the eyes of U.S. personnel on one of the upper floors of the Foreign Ministry building--was reported by the highest priority cable, whereas reports of negative indications--neither Lenin nor the live inhabitants of Moscow, neither fire engines nor ferocious animals ever left their normal quarters--arrived by slow boat, or not until personnel returning to Washington underwent an end-of-tour debriefing. Next time it would help to know in Washington which items in the MOG had been checked and which of these conveyed "no information," which were normal, and which ominous.

Prospects for increasing the MOG type of emergency collection appear to be improving. There is now an Indian consul stationed in Odessa; his

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* The simplicity; economy, and reliability of embassy wives emerges from comparison with other intelligence systems, not other wives.

cooperation would double (from 1 to 2) the cities covered. Then if a U.S. consular office opens in Leningrad the coverage could be tripled.

Disaster Columns

Paramilitarized relief and recovery columns based in rural areas under the civil defense program offer another possible set of indicators. The task of these "disaster columns" is to move into a nuclear-devastated urban area and attempt to assist the injured, limit damage, and restore or salvage what they can. They are to get their personnel mostly from the farms, their transport and earth-moving equipment from farms and from construction projects. Similar city units to be evacuated in an emergency draw personnel and equipment from factories, utilities, and service groups. Both the Soviet press and secret intelligence suggest that the rural relief columns have not yet developed much beyond the planning and organization stage, but there has been recent public exhortation to increase efforts to equip and train them.

We have no source with a demonstrated ability to observe and report promptly an alerting of the disaster columns. Still, collection possibilities seem fairly good. The columns will directly involve large numbers of people. And if alerted they would disrupt the activities of even larger numbers by their claims for equipment on farms and construction activities. Thus the immediate task is to determine the procedures prescribed for the disaster columns as they are organized and trained, so that emergency collection requirements and means to meet them may be established.

The foregoing discussion may suggest that the prime task in day-to-day observation of the Soviet civil defense system is measurement of its alertness for near-term use. In fact, it is not. Although portions of the system have been alerted and exercised, there is no evidence of any national exercise having been staged, even one of a command-post type. The most widely held (but not necessarily the best) guess at the reason for this apparent shortcoming is that the Soviet population has a proclivity to read too much between the lines and might react in ways that would hurt, for example panic buying.

Over the years, in support of the National Indications Center and the Watch Committee, economic analysts have charted the slowly growing capabilities of the civil defense apparatus. They seek the answers to such questions as: "Does the disaster column program have a readiness date? Does it require the diversion of resources from some other user? How effective will the columns be?" In order to answer such questions as well as possible the collection and analysis of data on civil defense developments must be a day-to-day process rather than one concentrated on periods of crisis.

The overwhelming majority of the answers have, in NIC jargon, been "negative." That is, we have never (Cuban crisis included) discovered an urgent effort to achieve early readiness, peak at a given time, or otherwise meet a specific target date. It appears rather that the Soviet regime believes civil defense to be a necessary part of the balanced economic and military power base of the state which, like the other parts of that base, must more or less keep pace with general progress.

Suppression for Surprise?

What of the possibility of a surprise attack plan which omits any direct pre-action alerting of the civil defense apparatus? Summarily, such a plan is considered to be unlikely. Even if we ignore the strategic military reasons for using the civil defense system, whatever its capability (as well as the even more cogent military reasons for not meditating an attack at all under the present balance of forces), there remain a number of considerations against it.

Civil defense is an integral part of Soviet power. In some areas, when a regional military authority has conducted an air defense exercise, the regional civil defense mechanism or some part of it has also been exercised. The military authority can do this because civil defense is now a military responsibility. The regional military commander is trained to consider civil defense another of his many tools. Consequently, it appears that a decision to omit civil defense would be administratively as complex as a decision to cancel participation of aircraft in an air defense effort and leave the job entirely to missiles.

The military commander, however, does not bear sole responsibility for civil defense. The party, the economic bureaucracy, and the civil government each has its own responsibilities, chain of command, and interlocking liaison with respect to it. In order to omit civil defense from a surprise strike plan, positive instructions to prevent the execution of standing operating procedures would thus appear to be necessary at a multitude of geographic locations--would need to go to party officials, military officers, civil government bureaucrats, and managers of factories, and would need to go to many levels in each of these hierarchies. With so many people involved, the planners of the strike have a problem: would the security of the surprise be well served by an attempt to leave out civil defense?

Most important is the probability that the party leaders would not accept a military plan which excluded civil defense participation. One totally unacceptable result of such a plan might be the decimation or worse of the party while the military leadership remained relatively

unimpaired. Another consideration of the Presidium ought to be the reaction of the surviving members of the populace, as well as of the party, if available civil defense facilities had not been put to use.

Above all, the party leaders remember the effects of World War II on Soviet industry and the prodigious logistic efforts required to fight the war and afterward to rebuild the economy and restore the culture. Even now the demographic effects of World War II present problems of labor force and military manpower. It is these memories and the dangers of nuclear warfare, not charity, that have caused the party leaders to expend the money, effort, and manpower to create a civil defense organization, along with strategic reserve and industrial mobilization systems.

To sum up, the Soviet civil defense program involves millions of people in a multitude of tasks. It is considered a basic component of national power, and there are strong reasons for expecting it to be activated even in connection with a planned surprise attack. Current collection systems are relatively inexpensive and reliable, and they are capable of timely reporting on the activation of at least some part of the system. Prospects for this reporting appear to be improving rather than diminishing. Let us now look at indicators in other economic fields that can be monitored with existing collection capabilities.

Transportation: Pre-attack Moves

Because the Soviet transportation system is usually operating at close to capacity, a major increase in military movements would disrupt normal traffic patterns. The operation of the system is consequently of great interest for strategic early warning. Moreover because the bulk of transport is concentrated in rail facilities, the Soviets are concerned that the existing system might not give them the flexibility and service they would need after a war had begun, and schemes to remedy the projected shortcomimgs are probably also of value in pointing to possible indicators.

These propositions are not just wishful thinking on the part of U.S. intelligence officers. The July 1961 issue of the Soviet journal Military Thought (secret edition) contained an article which discussed military transport in much this light. The author was quite concerned lest the West be tipped off to any imminent action against NATO by the total disruption of normal freight when reinforcements were moved to the western front. He proposed, in order to allay this danger, that a large proportion of normal movements be continued and the reinforcement trains mixed in as a minor part of total rail activity over several weeks.

From the Soviet viewpoint the problem of concealing this westward reinforcement of the ground armies, a necessary action under the "balanced force" concept, is complicated by the difference in gauge between Soviet and European railroad tracks. At each border crossing point, paired tracks of the two sizes parallel one another in order to facilitate train-to-train transloading. These transfer yards have grown slowly but steadily, and some now reach many miles both east and west of the Soviet border.

Surveillance of the routes, crossing points, and yards in the western USSR and abutting parts of eastern Europe should reveal by direct observation the reinforcement of the armies facing NATO. For indirect acquisition, information useful to the strategic warning process should be available to a number of railroad men, bureaucrats in economic administration, and plant officials on both sides of the border. These people would quickly be aware of an either general or partial embargo on civil freight or passenger traffic, and many of them could determine whether it resulted from military usage of the system.

Wartime Capability

Soviet military planners also appear to be much concerned about the difficulties their transportation system will face in providing the required service after the start of a war. A variety of measures intended to strengthen it have been proposed, some of which would offer opportunities to collect early warning information. Because some of the measures could also serve purely economic ends, however, both collectors and analysts must treat them with care.

A central organization for the control and direction of all forms of transportation would increase the efficiency, flexibility, and recuperability of the Soviet system. With central direction, priority freight could be more rationally shuttled among various routes and carriers and around bottlenecks and damaged facilities; repairs could be organized in better accord with national priorities. The intelligence officer concerned with strategic warning therefore watches constantly the administration of Soviet transport. Centralization, subordination to the Ministry of Defense or a supraministerial body, and military staffing of either the operating or directing levels of transportation administration are considered possible moves that would have meaning for early warning.

A wide range of physical improvements in peacetime have also been suggested as means to strengthen the wartime capacity of Soviet transport. At one end of the range these consist simply of more facilities, especially of kinds other than railroads--more pipelines, more and better roads, improved canals, and more double tracking.

Less grandiose proposals are for road and rail bypasses around cities, alternative bridging, and extension of Soviet-gauge track farther into eastern Europe. Proposed emergency measures include road trailers to move rail cars across breaks in rail lines, stocking of reconstruction materials in the vicinity of probable Western priority targets, and last-minute evacuation of transportation equipment from target areas.

We do not know which of these proposals might be implemented in preparation for an anticipated war. Economic development requires that some of them -- the "Friendship" oil pipeline into eastern Europe, for example--be acted on without particular regard to their military utility. Others, particularly evacuation of transport equipment from target areas, would be either very expensive or so disruptive of normal military and civil activity that they are unlikely. But if evacuation did occur, it would be an unmistakable sign that large-scale hostilities were imminently expected.

Finally, in addition to land transportation, the intelligence officer must follow Soviet merchant shipping and civil aviation. Normality in the deployment and occupation of the merchant marine has been a comforting phenomenon during past crises. Sometimes the Soviets have moved ships out of an area of immediate danger, but they have not put them in safe havens. If they really mean business one would expect them to move at least some ships to home or friendly ports. As to aviation, almost as many high-performance air transports are operated by Aeroflot as by U.S. air carriers. These planes plus the military air transports provide a substantial airlift potential, and so any unusual activity in Aeroflot needs to be identified.

Thus transportation, like civil defense, should be featured in a list of activities that under existing collection capabilities could provide useful, perhaps conclusive, strategic warning information.

Strategic Reserves

Over the years the Soviets have quietly created a vast and expensive system for maintaining strategic stockpiles. It is administered unobtrusively and with unusual care from Moscow by the Chief Directorate of State Reserves, apparently directly responsible to the Council of Ministers. Its object is support for a war effort. It was used for the initial effort in the Korean war.

For this purpose the Directorate administers and operates stores of foodstuffs, raw materials for industry, semiprocessed materials, finished manufactures, medical supplies, fuels, spare parts, construction materials--some of almost everything. It is not the only operator of storage facilities in the Soviet Union: The Ministry of Defense has depots; factories and distributors hold limited inventories; economic

and political administrative institutions keep some stocks. But State Reserve inventories are probably by far the most important. They were designed, for example, to enable the economically deficient eastern littoral of the Soviet Union to operate for extended periods without the aid of the vulnerable Trans-Siberian Railroad.

Under Khrushchev the rules governing the withdrawal of materials stored in the facilities of the Directorate were relaxed to allow use in easing the effects of natural disaster and economic abnormalities--in June 1964 Tass noted that farmers lacking seed were being supplied from state reserves. But the primary purpose of the system--strategic reserve for war--remains. Withdrawals from stock are not a routine bureaucratic procedure; high officials must rule on each individual release and approve the replacement schedule. Accounting procedures, including physical inventory, are apparently stringent. The refreshing process, putting old stores into service and replacing them with newly procured goods, seems to be pursued with care.

As long as the Chief Directorate of State Reserves exists it must be presumed to have a role in any Soviet plan to start a large war, and it may have one to play in limited war. In recent years, however, the value of this knowledge to the indications process has been slight because the intelligence community lacks a source for timely and detailed information on actions of the institution. The USIB's Economic Intelligence Committee reaffirmed in 1964 that development of such a source is one of the first-priority requirements for economic information. Prospects for filling this requirement are uncertain.

Industrial Mobilization

Another unique Soviet institution (or perhaps set of institutions) is designed to coordinate the efforts of industry and transport in filling wartime military needs. It is most easily explained in terms of the pre-1957 economic administration because there was information on its operation then. Prior to 1957 the Soviet government ran the economy through a series of ministries based in Moscow; there was an oil ministry, an aircraft production ministry, an ocean fleet ministry, etc., sometimes close to fifty of them. Each ministry was subdivided into departments, some functional, like supply or finance, some product-oriented, e.g., fighter aircraft production, and some geographical, as eastern area oil exploration.

Now each ministry had also a military affairs office called the "Military Mobilization Department," and the administration of each factory, railroad section, river fleet, or other activity had a similar subdivision under one of a variety of names--mobilization section, special department, secret department. These two, the ministry department and the factory department, had a number of different responsibilities, depending

on the kind of ministry or facility it was in. For example, at plants which had been converted after the war to the production of agricultural implements instead of small arms and ammunition, the responsibility of these departments included maintenance of an ability to switch back to arms--the required equipment, limited quantities of raw materials, and personnel with the right skills. Another responsibility was to keep track of the draft status of the employees in order to assure that quotas for draftees and for skilled production personnel would both be met. It was the factory departments that handled classified documents at the plant level.

Like all Soviet institutions, these were required to submit many reports. The instructions for some of the reports, which have come into the hands of U.S. intelligence, clearly assumed that these units would be deeply involved in the Soviet actions precedent to initiation of any major military action. In some instances they were the channel through which the civil defense readiness of the plant was reported to the ministry in Moscow and would have been the channel for reporting the effect of enemy military action on the plant. The intelligence officer concerned with economic activity in the Soviet Union presumes that these units will continue to play a considerable part in any Soviet preparations for war.

Again, as reflected in the 1964 updating of EIC priorities, the intelligence community needs a source. In at least one of the few economic ministries that retain more or less their pre-1957 form, the units continue to exist and to function. Soviet attitudes and procedures being what they are, the continuity of the system would be assumed without any evidence at all, but there is some indication that units at the factory level also continue to exist. A source is now needed for much more basic information than the alerting of the system. We need to reidentify its parts and rediscover its procedures after the constant shuffle of industrial administrative bodies since 1957. Prospects for such a source do not appear very bright.

The four activities discussed above (strategic reserves, the industrial mobilization system, civil defense, and the transportation system) are the ones that the economic intelligence officers in CIA consider the most likely to be productive for indications purposes. They are the fields that are kept under constant review for the National Indications Center, subject of course to what the quantity and quality of reporting are at any given time. The list of four, however, by no means exhausts the economic phenomena from which early warning indicators may be derived. Indeed, they may not even be the most important.

General Economic Activity

At least some economists turned intelligence officers believe that their most important contribution to the warning process is the continuing analysis of the totality of Soviet economic policy; they believe that a Soviet decision as important as to go to war will be reflected in a variety of broad economic developments. These might include great changes in the share of investment resources going to support military activities, in the division of construction activities between projects offering a relatively quick return and those having a slow return over a very long period, in the proportion of total goods available assigned to people for consumption and to industry for investment opposed to that available for military forces, in the way the annual addition to the labor force is divided up, and in the assignment of priorities among the various claimants in the economy.

Other intelligence officers, including economists, arguing that data on general economic policy is too imprecise to be of great value for early warning, point out that conclusions reached in the last 10 years or so via this route have regularly been that the Soviet Union is hell-bent for peace. The fact that there has been no global war in this period does not demolish the objection: in late October 1962 economists involved in intelligence were not likely to be making arrangements for a winter vacation in southern Florida, even though the evidence from Soviet economic policy suggested that it would be reasonable to do so.

Strictly, it can be claimed only that the total economic picture should tell us what the potential enemy ought to be considering if he is rational, not what he will necessarily do. The Chinese Communists, for example, would be unable at present to sustain a massive military operation over an extended period, but Mao and friends might still start one. At times, nevertheless, the total economic view can be fairly conclusive. In late 1963 and up to Khrushchev's fall in 1964 a variety of sources, secret and public, have given evidence of a Soviet economic policy so clearly reflecting peaceful intent that it should prevail even in the face of fairly strong contrary evidence.

In practice, the National Indications Center and the Watch Committee have been interested in Soviet economic policy only as background for the week-to-week examination of more direct indicators. Though this practice may seem to neglect an important part of the total picture, there are valid reasons for limiting broad economic policy to a background role. The information on which judgments about this policy are based is more often than not obtained from open Soviet sources and is therefore subject to manipulation by the Soviets. It

also requires interpretation, which can be a long and involved process, and frequently it is not timely enough for indications purposes. Material in open sources becomes available when the Soviet publisher is ready, not when the economic intelligence officer needs it.

Bottleneck Intelligence

Under this heading one can collect the unending flow of reports on shortages of particular kinds of equipment and materials in the Communist world. The warning watchman is traditionally interested in the bottleneck because it might reflect a diversion of the commodity in question from normal to military use ("Lucky Strike 'green' has gone to war!"). A typical example might be the periodic Soviet shortages of petroleum products, generally diesel fuel or bunker oil. The bottleneck report of a commodity specialist is generally his most frequent contact with the indications process. All such reports are carefully reviewed for indications implications.

The commodity specialist himself, however, is not likely to consider bottleneck intelligence a very useful input for strategic warning. Because the Communist economies are continually trying to get from available resources the maximum output and because these resources frequently do not stretch as far as the planners had scheduled them, shortages are a permanent part of all economic systems like the Soviet. The specialist might even find it more disturbing if all references to shortages among the commodities he watches disappeared from the Communist press; the disappearance might be a reflection of tightened security, which in turn might suggest some dark intent. Moreover, a confirmed or admitted shortage in a commodity which he had estimated to be in good supply might move the analyst rather to question his previous estimates, all too often based on inadequate sources, than to suspect a diversion to military usage.

Most investigations of bottlenecks as indications turn out like one made at the request of a congressional leader who had been told that the Soviet purchases of Canadian and U.S. grain reflected very high military consumption of alcohol (industrial) rather than a crop too small to feed the population. The gist of the intelligence reply was that even if Soviet military use of alcohol exceeded U.S. military use by 10 times it would still consume only about three percent of Soviet alcohol output, far too little to require large grain imports.

In the light of his experience the commodity analyst thus properly looks first to the economy rather than to hostile intentions for the explanation of all shortages. Even when he cannot find an economic explanation he remains reasonably sure that there must be one. That he still looks carefully for indications implications in each new shortage does credit to his integrity, for he feels like a man examining clams for pearls.

And Others

A myriad of other possible economic events might theoretically provide valuable indications information, but limits on collection capabilities and on the ability to generalize from fragmentary information (like data on one activity at one facility at one point in time) severely reduce the logical possibilities.

A large "unknown" area in the potential utility of economic intelligence for strategic warning is covered by the items in the General Indicator List which refer to relocation of plants, increased output in armament plants, and changes in the pattern of industrial output. The validity of such indicators and to some extent the prospects of collecting information on them would depend on what assumptions were made as to the kind of war plan the USSR might settle upon. There is little precedent in the history of such activities to serve as a guide for early warning; some redirection of economic effort occurred during (but not before) the Korean war.

In practice, there are only a few additional economic areas of occasional concern, even as background, to the NIC and the Watch Committee. Economic developments in the GDR are of considerable background value for strategic warning. In particular, the level of interzonal trade has over the past several years been a good gauge of the intensity of Communist feeling on the Berlin issue. Moreover, it is difficult to see how the Group of Soviet Forces Germany could be put to extended use without the support of the GDR railroad net, which is sometimes hard pressed to handle normal loads and therefore could not move greatly increased military traffic without cutting off its civil customers.

The varying priorities accorded Communist agriculture are also of background value. For an extreme example, the periods when significant number of troops are engaged in digging potatoes or moving wheat seem unlikely to bring war. At other times the Soviet Union is involved in one of its chronic reorganizations of economic administration (such as that being prepared in the fall of 1962), with inevitable disruptive effects on command, output, and supply flows, aggravated by infighting for position in the new scheme. That such a reorganization is in progress does not preclude war, of course, but it does indicate strongly that the possibility of war is not preempting the undivided attention of party and government leaders.

Construction projects are of occasional concern in early warning. Information on important projects is sometimes available with little time lag, and analysis of the purpose, priority, and cost of the effort may then be of significance.

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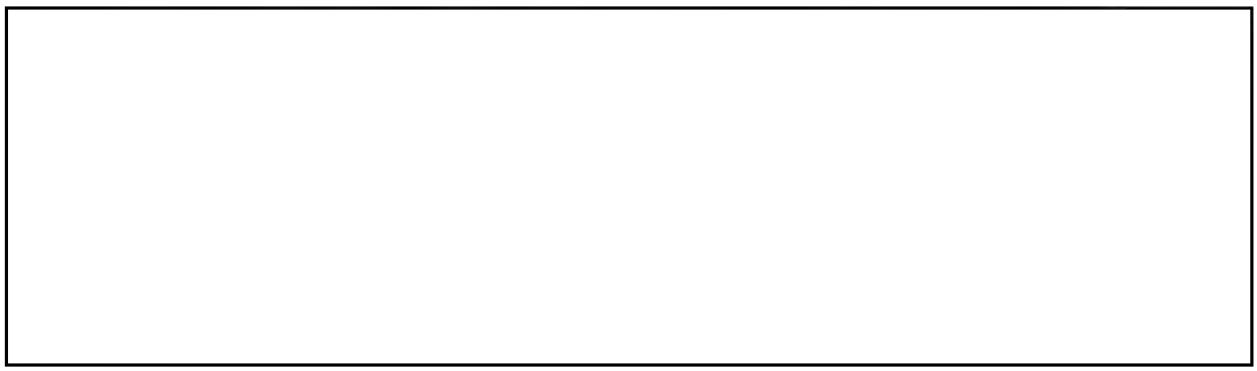

AERIAL PHOTOGRAPHY FOR AGRICULTURE *

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Aerial photography has been used in the United States for several decades to obtain useful information on agricultural resources, and in recent years intelligence analysts have taken increasing advantage of it for help in estimating crops and identifying trouble spots in the agricultural sector of Communist countries. As a source of intelligence on the agriculture of a foreign power it is still in its infancy, but it shows promise of becoming a valuable aid.

Stagnation in Communist Agriculture

Communist leaders have revealed an increasing awareness that the provision of an adequate supply of food is one of their most critical problems. In nearly all Communist countries stagnation in agriculture has seriously damped economic growth. Because of this stagnation in the face of continued increases in population, they have had to spend an average of more than $1 billion annually during recent years to purchase grain from the West, while by way of contrast the United States earns about $2 billion annually from sales of grain abroad. These purchases of grain have placed a severe strain on Communist reserves of gold and foreign exchange. For the USSR and particularly China, grain imports have meant a sacrifice in the acquisition of badly needed machinery and equipment.

The Communist leaders now realize that agriculture must be accorded a higher priority than in the past, even though this may require some diversion of investment funds from defense and heavy industry, the traditional priority sectors. Emphasis is being given to agricultural intensification--getting higher yields per acre. Increased supplies of mineral fertilizers, pesticides, and improved seeds have been promised, along with expanded irrigation and higher incentives for farm workers and managers. The USSR's record crops in 1966 reflect

25X1A * Studies in Intelligence, Vol. 11, No. 4 (Fall 1967), pp. 31-36.

in part this greater priority. But to what extent the Communist effort can mitigate the serious agricultural problems that stem largely from the nature of the system remains a critical question before the economic intelligence analyst.

Crop Estimation Procedures

The analyst attempting to evaluate the current agricultural situation in the Communist countries has a very difficult task. Inadequate sources of information make the estimating process much less refined than he would like. He is envious of the U.S. Department of Agriculture's Statistical Reporting Service, which in estimating U.S. crop production has available the periodic returns from more than 850,000 volunteer crop and livestock reporters scattered throughout the country. He himself has to build up his estimate of the early summer condition or the final harvest of a Communist crop from scattered bits and pieces of evidence.

In trying to determine, say, the actual amount of grain harvested in the Soviet Union in a given year he begins with an estimate of sown acreage by region and by kind of grain. Yields per sown acre by crop are estimated from widely variant sources--detailed weather information provided by the U.S. Air Force, reports from the press and Western travelers describing the condition of the crop at various times during the season, the reported progress in seeding and harvesting, data on grain procurement in various administrative subdivisions, general statements made by Soviet officials, data on inputs such as machinery, fertilizer, and seed. These estimated yields per acre are checked against the figures obtained for earlier years when crop and weather conditions were similar in the respective regions. Then they are multiplied by the estimated sown acreage to give the production of each kind of grain and the total grain harvest.

In the past few years aerial photography has become an important new source in this process, primarily, thus far, as applied to China and North Vietnam. Here its supporting role has been considerable because of the paucity of data on these countries. In the early 1960's U-2 photography over China partially filled the almost complete vacuum of information on agricultural production. During the spring of 1963, for example, weather information and Chinese press and radio reports indicated the possibility of a rather severe drought in south China. Chance availability of U-2 photography over south and central China at various times from January to June provided confirmation in the form of dried-up river beds and reservoirs as far north as Hunan province. Similarly, in the late summer and autumn of 1963 the Chinese press and travelers reported severe flooding in the north China plain. Weather data also showed above-average rainfall for the period of March-July, followed by very heavy rains over

large areas in the first ten days of August--up to 18 inches in the area of maximum precipitation. U-2 photography in September and October 1963 revealed that large areas of the plain were still covered by water.

More basically than in this verification of moisture conditions affecting crop production, the photography of North Vietnam and China has been valuable for purposes of familiarization with agricultural processes and projects in the two countries. From reconnaissance photography over North Vietnam the photointerpreters have been able to tell what state of preparation fields are in for rice culture and then the crop's stage of maturity--from seedlings to fully mature rice being harvested. A number of farming operations such as plowing, transplanting, and harvesting were readily identified. It has also been possible to spot certain conditions that, depending on severity and time of occurrence, could significantly affect crop yields, such as lodging (grain flattened by wind or rain) and flooding. Photography of China has been particularly helpful in evaluating the success of programs to reclaim land and develop irrigation. Large areas of reclaimed land in northern Heilungkiang province appeared to have been abandoned. In other areas, particularly in the north, many canals dug during the Leap Forward were subsequently refilled and the land returned to cultivation

Potential Refinement

Experts in the development of remote-sensing devices believe that satellite-mounted remote sensors have great potential as an aid to estimating crop production worldwide. Wernher von Braun, asked about the possibility of directing some of the "technological spin-off" from our moon program toward solving the world's hunger problem, replied:

> It has been demonstrated with airplane flights, using some sophisticated photographic equipment and remote sensors, that from high altitudes you can distinguish very clearly rye from barley, soybeans from oats. Moreover, you can distinguish healthy crops from sick ones. You can, for example, distinguish corn afflicted by black stain rust from healthy corn. You can also find out whether the proper fertilizer has been applied, whether there is too much salinity in the soil.
>
> By continuously surveying and re-surveying the tilled areas of the world--by keeping track of each patch of land as it develops from the planting season in the

> spring to the harvesting season in the autumn--you can predict very well the crop expectations on a global scale. When drought hits an area, you will find a local setback. If some crop has been damaged or destroyed by hail, your satellite-mounted remote sensors will find it.
>
> As you get closer to the harvesting period you can, by feeding all that information into a computer, predict just how much of a crop to expect, and what kind, and when and where.
>
> Of course, you would need plenty of correlation data before the data produced by such a satellite system would be reliable. You get this correlation simply by comparing the "ground truth," or the facts determined by a man walking through a field, with what the satellite equipment sees in that same field.*

Well in advance of this suggestion from Von Braun, CIA's research and development organization had begun intensive investigations of the feasibility of determining yields of rice, wheat, and sugar cane from high-altitude photography, and the preliminary results were affirmative.** Flights were made with cameras of such focal lengths as to simulate from several conventional altitudes the corresponding high-altitude scales. A few flights were made at U-2 altitudes for purposes of correlation. Photography was also taken from a 150-foot tower to permit large-scale sequential photography of test crops planted adjacent to the tower. Various filters were tried in combination with black-and-white, color, and infrared film. Ektachrome infrared seemed best for rapid monitoring of a crop's health, but once yield-reducing factors were suspected the black-and-white was better able to discriminate among these factors.

In these investigations a preliminary photointerpretation to establish parameters was conducted during the early stages of each crop, and then its further growth was followed by photointerpretation at various stages. The procedure used in estimating yield was to estimate degradation from a theoretical maximum potential yield. It was assumed that, given seed

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* U.S. News and World Report, 12 Dec. 66, p. 66.

** "Investigation on the Feasibility of Determining Yield of Rice, Wheat and Sugar Cane by Means of High Altitude Aerial Photography," Vols. I, II, and III, Final Report ORD #2265-66.

typical of the variety grown with success in the study area and a suitable plot of ground, a perfect crop of known yield would result except for the action of yield-limiting factors which may become operative from the day the seed is sown. These degrading factors may be classified as physical, that is the absence of crop-producing plants in any part of the field or less than ideal plant density, or physiological--pests, disease, drought, or other operants against the vigor and hence the yield of the plants. These factors may affect yield in decidedly different ways depending upon the severity of their manifestation and the stage of growth at which they appear.

Statistical analyses were performed on the results of the photointerpretation as the yield estimates so reached were correlated with ground-truth yields obtained after harvest. Sources of error were evaluated with respect to each of the photographic scales, film-filter combinations, and photo dates. It was found that a number of the yield-reducing factors--disease, insects, weeds, drought, flood, winter-kill, mineral deficiencies, toxicities--can be assessed on aerial photography. For an accurate assessment of the degree to which these will affect yields, however, the photography must be taken according to specifications tailored to each factor so as to detect the extent and severity of its manifestations. It must be taken in the spectral bands that give the best tone values for the factor in question. It must also be taken at the right times during the growing season.

The contractor who carried out this investigation is testing the technique on a larger scale during the 1967 growing season by undertaking to estimate the yield per acre and total production of wheat for the state of North Dakota.* North Dakota, the leading U.S. spring-wheat-producing state, is in many ways climatically analogous to the new lands area of the USSR. A five-mission schedule with U-2 aircraft was carried out during the June-September period, each mission making three north-south flights across the state. The photography, taken by multispectral filtration, is still undergoing analysis at time of writing.

One of the difficulties in analyzing the output of photographic reconnaissance is the tremendous volume of imagery that must be scanned. The problem becomes particularly acute when the target is agricultural production, with scattered fields of different types of crops covering hundreds of square miles. Its solution may lie in sophisticated sampling procedures, or in a high degree of automation in the interpretation of the photography, or in a combination of both. An ultimate goal is the

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* "Technical Proposal for 1967 Chitter Program." ORD #570-67.

development of remote sensing systems that require little or no human participation to reduce their raw data to the desired end information. One system now under investigation records the relative amplitude of spectral components of the radiation emanating from a source and applies automatic pattern recognition techniques to identify designated characteristics so revealed. This research, now under way at Purdue University under U.S. Department of Agriculture and NASA contracts, assumes that various crops can be differentiated on the basis of multispectral response "signatures" at various times during the growing season and that for any particular crop it will be possible to determine what variations in the response signatures are caused by yield-influencing factors and so distinguish these. In initial tests the computer output provided a good reproduction of a strip of Indiana farmland one mile wide and five miles long, plotting the major vegetative patterns on it. The operational stage of automated scanning and data reduction is unlikely to be "just around the corner," however.

Outlook

The results of developmental research to date in aerial photo estimation of crop yields make it seem likely that this technique will become an increasingly important tool for the intelligence analyst estimating Communist agricultural production. For the foreseeable future, however, it will probably supplement rather than replace present methods. And pending further development and refinement of techniques for computerized estimation from photographic patterns, the intelligence community will continue to rely on the skills of specialists in photointerpretation for qualitative evaluation of agricultural conditions in problem areas where photo coverage is available.

RUBLES VERSUS DOLLARS *

25X1A [redacted]

In the hearings on the Soviet economy before the Congressional Joint Economic Committee in 1959, Morris Bornstein of the University of Michigan presented three comparisons of the U.S. and Soviet gross national products. *** One of these priced both countries' goods and services in dollars, the second priced them both in rubles, and the third was the square root of the product (the geometric mean) of the other two. They showed, respectively, that in 1955 the Soviet GNP was 53% of ours when figured in dollars, 27% when figured in rubles, or 38% when these two were averaged geometrically. The procedure Bornstein used was identical with that used by intelligence analysts, and the data and results were essentially the same. Bornstein's paper was the first public revelation of any figure except the geometric mean.

The calculation comparing total Soviet and American production is done in response to the perennial question asked of intelligence, where does the Soviet economy stand in relation to ours? Comparing quantities of individual products--steel, coal, oil, electric power, cement, grain, tanks, aircraft--is necessary and more useful, but people still want an overall comparison, one that is comprehensive. Such comparisons of gross national products in dollar and in ruble prices have therefore been carried out as completely as possible. The geometric mean has been used as a "best" single-value answer.

When, however, two alternative calculations of what supposedly is the same thing differ so widely as by a factor of 2, the meaning and usefulness of the figures or their average are open to question. Since the Joint Economic Committee hearings the use of the geometric

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* Studies in Intelligence, Vol. 6, No. 1 (Winter 1962), pp. 1-11.

25X1A [redacted]

*** Comparisons of the U.S. and Soviet Economies, Joint Economic Committee of Congress, USGPO, 1959, Part II, p. 377-395.

mean as a meaningful comparison has been challenged by both American and Soviet economists for quite different reasons. The object of this article is to set forth the main outlines of the very complex calculations underlying the comparisons, to make clear their conceptual basis, and to show what interpretations of the comparative ratios are consequently justifable. It will explain why the dollar and ruble comparisons are not so good, and the geometric mean not nearly so bad, as critics have alleged.

Unit-of-Measure Bias

Comparison of two heterogeneous baskets of goods and services in aggregate requires that their contents be measured in a common unit. Standard economic procedure is to use money values as the unit of measure and to convert each basket of goods into a monetary equivalent by a set of prices. Each good or service in physical units (e.g., tons of coal) is multiplied by its price per unit (e.g., $25) and the resulting values are added together. But what prices should be used--in an international comparison which country's prices, and analogously in computing growth of output from one period of time to another, which period's prices? The choice, as Mr. Bornstein's figures show, can be of major quantitative significance.

This now familiar impasse is referred to by economists as the index number problem. It is conceptually insoluble. It is also universal. It occurs unfailingly in any aggregative comparison between two economic complexes separated in time or space. Until a few years ago there were no international comparisons based on a detailed valuation of one country's product in another country's prices. Most international comparisons were derived simply by converting the total value of one country's product in its own prices into the currency of another country by the international exchange rate between the two. In 1954 the pioneering study of Gilbert and Kravis * presented detailed comparisons of U.S. production with that of the UK, West Germany, France, and Italy. The results showed that the foreign exchange rate conversions were quite misleading. They also showed that the index number problem was significant for all the countries studied. The ratio of UK to U.S. GNP is significantly

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* An International Comparison of National Products and the Purchasing Power of Currencies, Milton Gilbert and Irving B. Kravis, OEEC, Paris, 1954.

higher in U.S. prices than it is in UK prices. Here the difference is less than in the USSR/U.S. comparison; but in comparing U.S. production with that of Italy the difference between the two ratios is about as large as with the Soviet. So the difference between the ruble-valued comparison and the dollar-valued one cannot be attributed solely to the artificiality of Soviet prices.

The index number bias is also uniform in direction. In every case the ratio of country A's GNP to country B's GNP is larger when the products are valued at B's prices than when A's prices are used. This holds for the Western European countries as well as for the USSR. In each bilateral comparison with the United States, the ratio of the other country's GNP to ours is larger in dollars than in its own prices. The same systematic bias holds in comparisons over time. In 1954 prices U.S. GNP in 1955 is 216% of that in 1929; in 1929 prices it is 222%. A spectacular index number spread for time comparisons is found in measuring the growth of Soviet GNP: in 1926/27 prices the 1937 Soviet national product, as measured by Jazny and Grossman, was 193% of the 1928; in 1937 prices it was 150%. *

The economic explanation for the index number problem is fairly straightforward. The price of one kind of goods relative to that of other kinds varies from time to time and place to place. Given transport costs and barriers to trade, relative prices may differ greatly between countries. Everyone is familiar with differences like the following: wine is relatively cheap in France, while beer is relatively cheap in Germany; domestic servants are relatively cheaper in most foreign countries than in the United States; fuels, oil, coal, and natural gas are relatively much cheaper here than in Western Europe; meat is relatively very expensive in the Soviet Union but standard machine tools are relatively cheap. Relative prices differ between countries because of differences in taste, culture, and habits and also because of differences in natural resources, capital/labor ratios, stage of development, and other factors that affect the cost of production.

Patterns of output also vary between countries, and their variation is related to the price patterns. Specifically, each country tends

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* Soviet Economic Growth, Abram Bergson, ed., Row, Peterson & Co., 1953, p. 7.

to use and therefore to produce relatively more of the goods which are relatively cheap. This tendency accounts for the systematic direction of the index number bias. To clarify this point a numerical example may be helpful. Suppose two countries, F and G, produce only two commodities, wine and beer. The quantities produced and the prices in each country are shown below.

	COUNTRY F		COUNTRY G	
	Price per liter (Francs)	Output (million liters)	Price per liter (Marks)	Output (million liters)
Wine	2	10	2	5
Beer	3	3	1	10

Then the total value of output in the two countries can be computed in either country's prices:

	VALUE OF OUTPUT			
	In million Francs		In million Marks	
	Country F	Country G	Country F	Country G
Wine	20	10	20	10
Beer	9	30	3	10
Total	29	40	23	20
Ratio F/G	72½%		115%	

In country F wine is cheap relative to beer and the population consumes relatively more wine, perhaps because the price is cheap; and the price is cheap because resources for producing wine are abundant. It is also possible that wine is cheap because the population likes wine and has concentrated on the tehcnique of its production. In country G the wine-beer situation is reversed. Because of these inverse price and output patterns, country G's total output is greater than F's when measured in francs but smaller than F's when measured in its own currency.

If in this example one substitutes the United States and the USSR for F and G and consumer goods and investment/defense production for wine and beer respectively, it is easy to visualize how the U.S./Soviet index number discrepancy arises. In the United States consumer goods are relatively cheap and investment/defense goods relatively expensive, and our pattern of output favors consumer goods. In the USSR the situation is reversed. The ratio of Soviet to U.S. output is larger in dollars because U.S. prices are relatively higher for the goods the USSR produces in relatively large

quantities. The pattern of output by major end uses is shown in market prices below.

COMPARISON OF SOVIET AND U.S. GNP FOR 1960 AT MARKET PRICES IN 1955 DOLLARS AND RUBLES

END USE	RUBLE COMPARISON			DOLLAR COMPARISON			GEOMETRIC AVERAGE
	USSR (billion rubles)	U.S. (billion rubles)	USSR as percent of U.S.	USSR (billion dollars)	U.S. (billion dollars)	USSR as percent of U.S.	USSR as percent of U.S.
Consumption	1,172	4,700	24.9	143	315	45.4	33.6
Investment	447	514	87.0	102	78	130.8	106.7
Defense	156	162	96.3	39	38	103.0	99.6
Government administration	22	30	73.0	10	14	71.0	72.0
Gross national product	1,797	5,406	33.2	294	445	66.1	46.8

The index number problem derives from differences in patterns of output which in turn derive from differences in resources and in national preferences. The wider the divergence in patterns of output, the wider the index spread. Comparisons of developed with underdeveloped countries yield extremely large spreads between the two valuations simply because the patterns of output are so different.

Partisan Positions

As indicated earlier, this problem is insoluble. There is no ground for choosing between the two alternative valuations. A

time-honored expedient has been followed in using their geometric average in public pronouncements. * The comparison the President made in his press conference of July 1961--that the Soviet GNP was 47% of ours in 1959--was the geometric average. This usage has been challenged by both Soviet and American economists. The Soviet economists have come out flatly for the dollar comparison, in which, of course, Soviet GNP is higher relative to ours. Interestingly enough, their justification is that in a planned socialist economy price does not have to correspond to value, i.e., real costs, and in fact does not in the Soviet Union. And therefore, they argue, the ruble valuation is meaningless.

The Soviet argument is specious. As the studies of Gilbert and Kravis show, the index number problem always occurs, and in general the more divergent the pattern of output the wider the spread between the two figures. The patterns of U.S. and Soviet production are very divergent indeed. We can estimate how much difference the irrationality of Soviet pricing does make in the ruble comparison. We can eliminate a considerable part (but by no means all) of the distortions in Soviet prices by converting market prices to the Western accounting concept of factor costs. Factor costs are calculated by subtracting from market prices any direct taxes included in them, like the Soviet turnover tax, and adding subsidies granted to the industries. The adjustment of Soviet prices to factor costs cannot be carried out in detail because detailed data on turnover tax rates by commodity are not available. Preliminary calculations, however, indicate that the use of factor costs would raise the Soviet GNP as a percentage of the U.S. in rubles by a few points but would not eliminate the bulk of the index number spread. **

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* The geometric mean is used in preference to the arithmetic because economic growth and other changes in general proceed geometrically; that is, constant percentage increases describe the changes better than constant absolute increases. The geometric average of two numbers exceeds the smaller of the two by the same percentage as the larger exceeds the average.

** The ratio of 47% in 1959 used by the President incorporated an upward adjustment from market price ratio to allow for the effect of factor costs.

Objections by American economists are more serious. Abraham Becker of Rand * has argued that the average is meaningless and should be abandoned, that the ruble and dollar comparisons are equally correct measures of relative output and should be equally and impartially cited. The basis of his contention is that while the ruble and dollar comparisons are precisely defined by the two real price systems used in the calculations, the geometric average of the two does not correspond to any existent price system. Another position is taken by Francis Hoeber of the Stanford Research Institute, who votes for the dollar comparison.** His argument, as nearly as I can tell, is simply that American prices are more familiar to Americans, who will therefore understand the dollar comparison better.

Both these positions impute more meaning to the comparisons than they can have. The GNP ratios, have a broad, general, far from precise meaning, one which tends to disappear if you try to pin it down. Like a faintly fragrant flower, it can be apprehended by gentle inhalations, but an attempt to extract the scented oil and subject it to chemical analysis will ruin it altogether. ***

Unknowns in the Equation

As background for a better appreciation of what the GNP index numbers mean let me outline some of the difficulties inherent in the data used to calculate them.

Procedurally, the conversion of Soviet product values to dollars and U.S. product values to rubles is carried out with ruble/dollar price ratios for individual goods and services. The ratios used, numbering a few hundred, are only a small sample of all prices in either economy. Each price ratio is applied to those sections of consumption, investment, defense, and government administration for which it is deemed to be representative: thus a man's suit, shirt, and pair of overalls are taken to be representative of the whole men's clothing category.

The small size of the price sample introduces a margin of uncertainty. Worse than that, it is limited to prices the USSR publishes, and it

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* World Politics, p. 99, October 1960.

** Soviet Economic Potential, 1960-1970, Francis P. Hoeber and Robert W. Campbell, Stanford Research Institute, 1961.

*** But we must reject on technical grounds any suggestion that the ratios be described as faintly fragrant numbers.

is therefore weakest in military hardware, construction, and custom-built equipment. And of course there can be no price ratios for the considerable number of both consumer and producer goods produced in the United States but not in the USSR. For many services, such as health, education, and government administration, the product itself, let alone the price, is indefinable. Here we use wage and salary ruble/dollar ratios, thus implicitly assuming that the services of one Russian doctor equal those of one American doctor, and similarly in the other service professions.

The measurements are inherently quantitative. The quality and specifications of each product in the price ratio sample are checked as carefully as possible: an average Russian men's suit is paired not with an average American suit but with one that appears comparable in quality, well below the American average. But this product-by-product comparability, even if it could be achieved with accuracy, would not take into account the vast difference in diversity and assortment in the two countries. There is no way to quantify these factors, but we know from observation and from Soviet statements that supplies of consumer goods of all kinds are badly balanced, some types being in very short supply and others in surplus and unsalable. Diversity and assortment problems are evident in the investment field as well; for example, the range and mix of agricultural equipment is poor by the Soviets' own admission. Nevertheless, if 100,000 agricultural tractors of a certain type are produced they are included in the measure of output, regardless whether there is a demand and economic use for that number of these tractors.

Another deficiency in the statistical procedure concerns the value of retail trade services, which is included in the value of the consumer goods compared. The goods themselves are kept comparable by matching the physical qualities of individual products, but there is no practical way of measuring the quantity or quality of retail service that goes along with the product. Thus a pound of ground beef is counted the same in the two countries even if in one it is accompanied by air conditioning, soft music, and quick service, in the other by clouds of flies, pungent odors, and interminable queuing.

It is hard to believe that these data deficiencies do not favor the USSR, making the dollar valuation of the Soviet product too large by some few percentage points. On the other hand, as we saw above, the use of ruble market prices rather than factor cost overstates the U.S. product in rubles. To what extent these two overstatements offset each other is impossible to say. For all these reasons, over and above the index number problem, the total GNP comparisons should be regarded as order of magnitude indicators and not as precise measures.

Rationale of the Mean

Let us now return to the meaning of the dollar and ruble valuations and their geometric average. The valuation of one country's output in its own or in another country's prices has a precise statistical meaning given it by the calculation procedure, i.e., the multiplication of commodities by a specified list of prices. Further, these prices are taken from an actual operating price system. But this is still far from an economic meaning. The price systems of the two countries subject to bilateral comparison are not the only possible scales of valuation; consider the possibility and desirability of multilateral international comparisons. If we were comparing the U.S., Soviet, and West German output there would be three price systems and three sets of ratios for the U.S./Soviet GNP. Each country added would add another set of comparative ratios. In what sense then is the dollar or ruble valuation uniquely "correct"?

In a precise economic sense none of the valuations are correct. Two production aggregates can be unambiguously compared only if they are made up of identical proportions of the different kinds of goods and services. The comparison of two GNP's with different proportions can be given meaning only by an assumption about the transferability of resources, the assumption, for example, that the United States can shift resources from the present pattern of output to any other one at prevailing dollar costs and prices. The dollar ratio of Soviet to U.S. GNP, 66% in 1960, would be unambiguously the measure of comparative output if the US were to shift resources until its output had the same proportional pattern as the USSR's and if the 1960 dollar value of this output were unchanged. Similarly, if the USSR were to shift resources in the opposite direction, leaving its ruble total unchanged, the ruble ratio, 33%, would be unambiguously correct. The two provisos are, of course, highly dubious assumptions. They imply that unit costs of production would remain constant at all levels of output for all products.

This argument leads to the main conclusions I wish to draw. First, the two comparisons could be described better as equally incorrect than as equally correct. Second, the geometric average of the two can be given a defined meaning by assumptions no more dubious, possibly much less so. The average ratio would be unambiguously correct if both countries could shift to an identical intermediate pattern of output, the value of each total output in the domestic currency remaining unchanged. The feasibility of such a shift is certainly not harder to conceive than a shift of either country entirely over to the other country's pattern. The geometric mean is a rough approximation to the comparison that would hold if the pattern of output in both countries were a mean between the present

patterns. In this interpretation it is a far from precise but still useful figure indicative of the relative overall size of the two GNP's.

Elements of Challenge

The third conclusion is that the capability for shifting resources lies at the heart of these interpretations. The figures shed no light on this capability; they require, on the contrary, an arbitrary assumption about shifts in order to have meaning. Thus specific questions about capability cannot be answered. For example, how much could each country produce of a specified list of defense goods and services under full mobilization? One could not deduce an answer from either the ruble or dollar comparison, but only, if at all, from a detailed study of the mobilization potential of each economy, industry by industry. The output comparisons really tell us nothing about capabilities for producing alternative mixes and hence nothing very precise about relative output. When and if the USSR reaches a level of output measuring 103% of the U.S. in dollar prices and 57% in ruble prices, it will be impossible, and probably at that stage of the game irrelevant, to say whether these ratios mean that it has caught up with us.

If the aggregate GNP comparisons are so ambiguous, of what use are they? They have found a place in the propaganda battle between the Bloc and West, but their analytical usefulness is limited. The useful quantitative comparison between the U.S. and Soviet economies is not of total GNP but of its separate segments. The table on page 70 shows that although there is an index number discrepancy in the individual consumption, investment, and defense components of GNP, it is a smaller one. This is because the difference between the two countries in pattern of output for each individual end use is less than in their production patterns as a whole. A breakdown (as detailed as possible) of the two GNP's in both sets of prices reveals precisely the divergence in pattern of output which causes the index number problem in the total GNP comparison and at the same time is obscured by the aggregation. The comparisons by end use show also the relative price differences which accompany the differences in output patterns.

The point to be emphasized in conclusion is that overall GNP comparisons--dollar, ruble, or average--do not measure in any significant sense the USSR's economic challenge to the United States. It is the uses to which productive capacity is put that are significant. Soviet GNP in 1960 may be 33, 47, or 66 percent of ours, but Soviet defense expenditures are approximately equal

to ours and investment for growth is also equal or perhaps a little larger than ours. In speeches by the Director of Central Intelligence and in many other ways it has been publicly reiterated that the Soviet economy, though significantly smaller than the U.S. over all, is growing much faster, particularly in heavy industry; that its production is concentrated along ominous lines--investment for more growth, armaments, and the development of new military technology; that its efforts in these fields are already comparable in magnitude to our own; that it is devoting its resources with all the power of a determined dictatorship to a long-run aim declared in Khrushchev's promise, "We will bury you."

THE ESTIMATION OF CONSTRUCTION JOBS *

25X1A [redacted]

The questions most frequently asked of the construction estimator are how long it will take to build an installation, how much it will cost, and how soon he can answer these questions. The answering requires some kind of estimative process, which may vary from what seems a mere intuitive guess to a time-consuming analysis of extensive data by complex methods. Among the more important determinants of the process are the qualifications of the estimator, the availability of data, and the methodology employed.

The process as carried out for intelligence purposes is generally similar to that used by the construction industry itself. In the construction industry, however, estimates are made primarily to determine the best and most economical way to do the job, whereas intelligence wants to know the actual cost and the time required, given the materials and construction methods in fact used. This distinct approach sets the intelligence process apart from that common in pre-bid estimating for construction projects. Moreover, the paucity of data available to intelligence usually precludes detailed analysis and requires a large measure of extrapolation and approximation.

Especially in intelligence, therefore, the validity of an estimate depends in large part on the estimator's practical experience and maturity of judgment. He should be thoroughly familiar with all aspects of the work involved in the project at hand. There is no substitute for the know-how imparted by long and varied experience on field construction jobs, and the estimate prepared in the office must reflect this field experience. Ideally, in view of the considerable differences in construction technology in different countries, the intelligence estimator should have obtained some of his field experience in the country in question. Since this is seldom possible,

* Studies in Intelligence, Vol. 7, No. 4 (Fall 1963), pp. 11-21.

25X1A [redacted]

he must consciously adapt his experience to the building methods prevailing there and minimize the use of direct analogy with U.S. practice.

On construction projects in the USSR the best single source of basic working data is found in the Soviet Norm Books for Construction, which list labor and equipment requirements and the cost for such units of work as excavating a cubic meter of earth or rock, placing a cubic meter of concrete, and erecting a ton of steel. Composite cost and time requirements for constructing various types of residential, industrial, and public buildings per square meter of floor are also given. Architectural journals furnish a great deal of helpful information on building construction; similarly transportation publications in the field of railroad, highway, and waterway construction and maintenance. Soviet handbooks give specifications for construction machinery and equipment and for building materials, and construction journals and newspapers place these specifications in practical context for the experienced construction estimator by discussing difficulties in the actual performance of equipment and materials on the job. Newspaper accounts of operations on current projects shed light on specific problems and how they are overcome.

Much of the data needed with respect to particular Soviet projects is derived from classified documents and publications which range from defector reports to the National Intelligence Survey. The latter gives geologic, meteorologic, and terrain information which can be of great value in determining the rate of progress to be expected in the work. Sometimes a refugee who had worked on the job can supply details about dimensions, materials used, methods of placement or erection, problems encountered, numbers and types of employees, and other things.

So much for the estimator s qualifications and his sources of information. His methodology can best be illustrated in a case history.

Men at Work on Missile Complex

The following report of information from an escapee is received:

1. A HIGHLY SECURE MILITARY INSTALLATION WAS UNDER CONSTRUCTION IN AN ISOLATED, FORESTED AREA NORTHEAST OF YURYA, KIROVSKAYA OBLAST, IN JUNE 1961. ALTHOUGH THE MEMBERS OF THE CONSTRUCTION BATTALION HAD NEVER BEEN TOLD THE PURPOSE OF THE PROJECT THEY WERE WORKING ON, THERE WAS GENERAL SPECULATION THAT IT WAS TO BE AN INTERCONTINENTAL MISSILE BASE. INFORMANT'S BROTHER HEARD FROM OTHER CONSTRUCTION WORKERS THAT ANTIAIRCRAFT ROCKET BASES HAD ALSO BEEN BUILT ABOUND YURYA.

2. THE INSTALLATION, WHICH WAS SPREAD OVER A VERY LARGE AREA, WAS GEOGRAPHICALLY REMOVED FROM ANY OTHER INDUSTRIAL OR CIVILIAN ACTIVITY. IT WAS LOCATED AT THE END OF A RAIL SPUR WHICH RAN NORTHEAST FROM THE TOWN OF YURYA ABOUT 15 KM. NEAR THE END OF THE SPUR A ROAD PARALLELED THE RAIL LINE FOR SOME DISTANCE AND TERMINATED IN A VERY WIDE LOOP IN WHICH THE ROAD DOUBLED BACK PARALLEL TO ITSELF AND TO THE RAIL LINE FOR ABOUT 750 METERS. ALL TRANSPORT WITHIN THE INSTALLATION WAS BY ROAD VEHICLE.

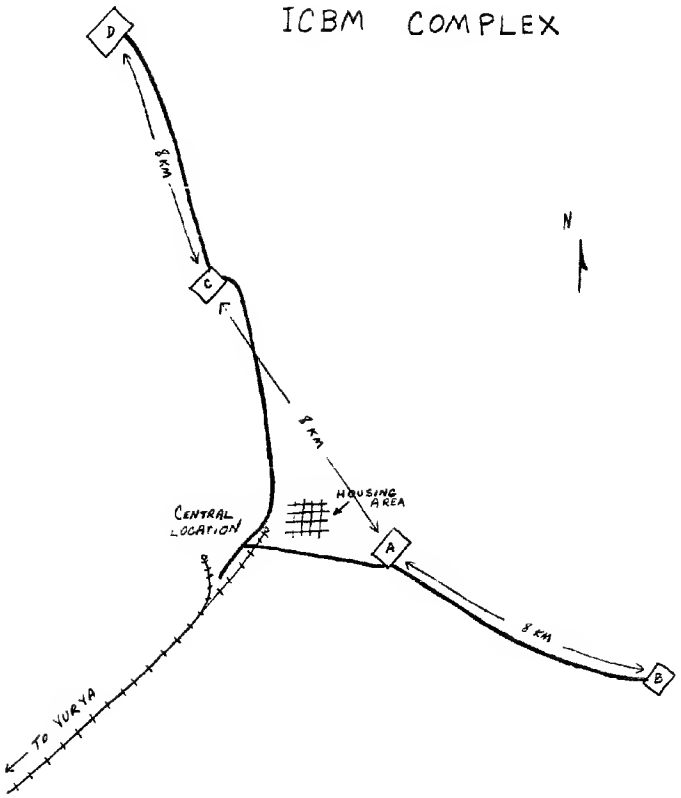
3. WITHIN THE BASE WERE FOUR SEPARATE AREAS, ABOUT 8 KM APART, CONNECTED TO EACH OTHER BY A ROAD. ALL FOUR LOCATIONS WERE SIMILAR IN SIZE AND SHAPE, ALTHOUGH EACH WAS IN A DIFFERENT STAGE OF CONSTRUCTION. EACH COVERED ABOUT 35 HECTARES (APPROXIMATELY 90 ACRES) OF GROUND, AND CONTAINED TWO LARGE FLAT EXCAVATED PLATFORM-LIKE AREAS, APPROXIMATELY 350 METERS APART, WHICH WERE PARALLEL TO EACH OTHER. IT WAS PLANNED THAT ALL THE PLATFORMS WOULD BE CONCRETED OVER. AT EACH LOCATION A ROAD CONNECTED THE PLATFORMS AND AN ACCESS ROAD RAN BETWEEN AND GENERALLY PARALLEL TO THEM. HOUSING FACILITIES HAD BEEN CONSTRUCTED EAST OF THE RAIL TERMINUS IN AN AREA CENTRAL TO ALL FOUR LOCATIONS.

4. CONSTRUCTION AT EACH OF THE LOCATIONS PROCEEDED IN STAGES. ONE CREW FINISHED THE FIRST PHASE AT ONE LOCATION AND MOVED ON TO THE NEXT; MEANWHILE ANOTHER CREW MOVED INTO THE FIRST AREA. BY THE END OF JUNE THE EXCAVATION WORK HAD BEEN VIRTUALLY COMPLETED FOR ALL FOUR LOCATIONS, AND IT WAS RUMORED THAT THE WORKERS WOULD BE TRANSFERRED TO ANOTHER PROJECT OF THE SAME KIND.

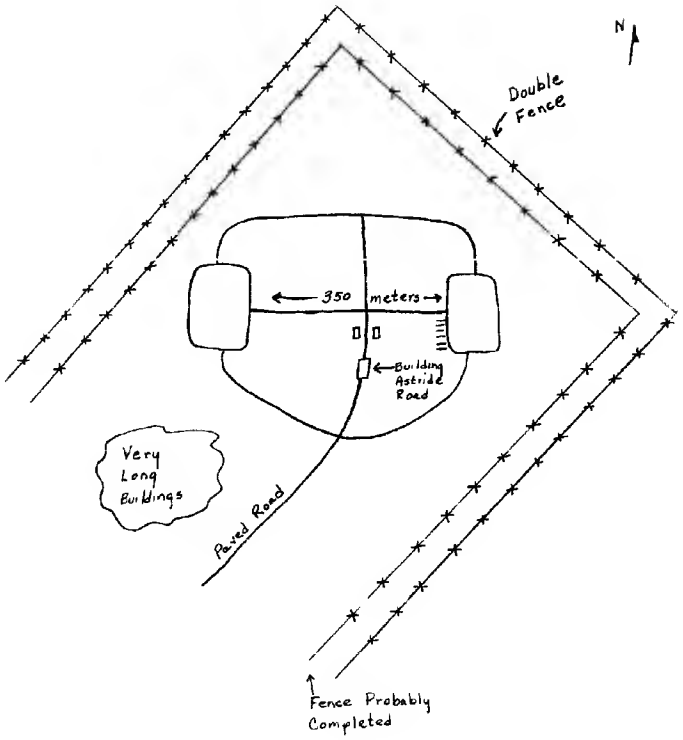
5. EXCEPT AT LOCATION A, INFORMANT DID NOT KNOW TO WHAT DEGREE PLATFORM CONCRETING HAD BEEN COMPLETED. INFORMANT UNDERSTOOD FROM OTHER WORKERS THAT AT LOCATION A, WHICH WAS IN THE MOST ADVANCED STAGE OF CONSTRUCTION OF THE FOUR, THE PLATFORMS HAD BEEN OR WERE ABOUT TO BE CONCRETED OVER; SEVERAL BUILDINGS HAD BEEN CONSTRUCTED, ONE OF WHICH WAS ASTRIDE THE ACCESS ROAD; AND A DOUBLE BARBED-WIRE FENCE HAD BEEN ERECTED. MOST OF THE CONSTRUCTION WORKERS HAD ALREADY LEFT THE LOCATION AND OTHER PERSONNEL WERE TO INSTALL EQUIPMENT.

The problem is to determine how long it would take to build the four launch sites and how much it would cost. It is simplified by the fact that their description fits previously known launch sites for which such estimates have been made. In particular, Site A seems to conform with the prototype launch area C at the Tyuratam missile test range, for which a detailed estimate has been prepared. Since Site A is in the most advanced stage of construction and shows the greatest detail of the four, the time sequence and breakdown of operations with respect to it will be studied first, and then the times and finally the costs can be extrapolated to cover the other three.

ICBM COMPLEX



LAUNCH SITE A



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Nevertheless, Soviet construction organizations do vary considerably in experience and efficiency, and the effect of this variation on costs, although extremely difficult to quantify, should be kept in mind as one moves from static considerations to dynamic and from microeconomics to macroeconomics. If a program of missile site constructions is judged to be of moderate size relative to the number and capabilities of experienced construction organizations and personnel that can be called upon, the cost per site, in general, is likely to tend toward the low-bid range. But if such a program seems massive enough to require, as it gathers steam, the employment of more and more construction organizations of less and less experience, the cost per site should settle in the high-bid range. In many estimates of the construction costs for new weapon systems we cannot expect to keep uncertainty within the plus-or-minus 20% of U.S. practice.

COSTING NUCLEAR PROGRAMS *

25X1A [redacted]

How much has the Soviet Union, Communist China, or France spent on its nuclear program? What is the cost of the French gaseous diffusion plant at Pierrelatte or of the nuclear test site in French Polynesia? Is the allocation of funds for these installations proceeding on schedule? How much has West Germany spent on what facets of nuclear research and development? What would it cost India, Israel, or Japan to convert its present program for developing nuclear electric power facilities to production of nuclear weapons? The intelligence community is frequently called upon to supply answers to questions such as these for two primary reasons--to gauge the burden nuclear programs impose on the economies of the countries concerned, and to compare the sizes of different countries' programs.

Attempts to measure the economic burden are usually related to the question whether cost is apt to deter a nation from undertaking or expanding a weapons program. Analysis for this purpose of the pattern of spending also reveals much concerning the nature and probable rate of development of a program. Cost and rate-of-expenditure studies constitute a useful approach to these problems.

Comparison of the size of different countries' nuclear programs is a less cogent reason for estimating costs, and cost comparisons of this kind must be interpreted with great caution. Comparison of probable capacities for production of nuclear materials is the direct and more appropriate way to get at the relative size of nuclear programs. Size can be measured in megawatts, quantities of plutonium or uranium-235, or numbers of weapons without involvement in complicated problems of monetary conversion. Conversion requires extensive studies of materials, manpower, wages, and productivity in the nuclear industries of the countries compared,

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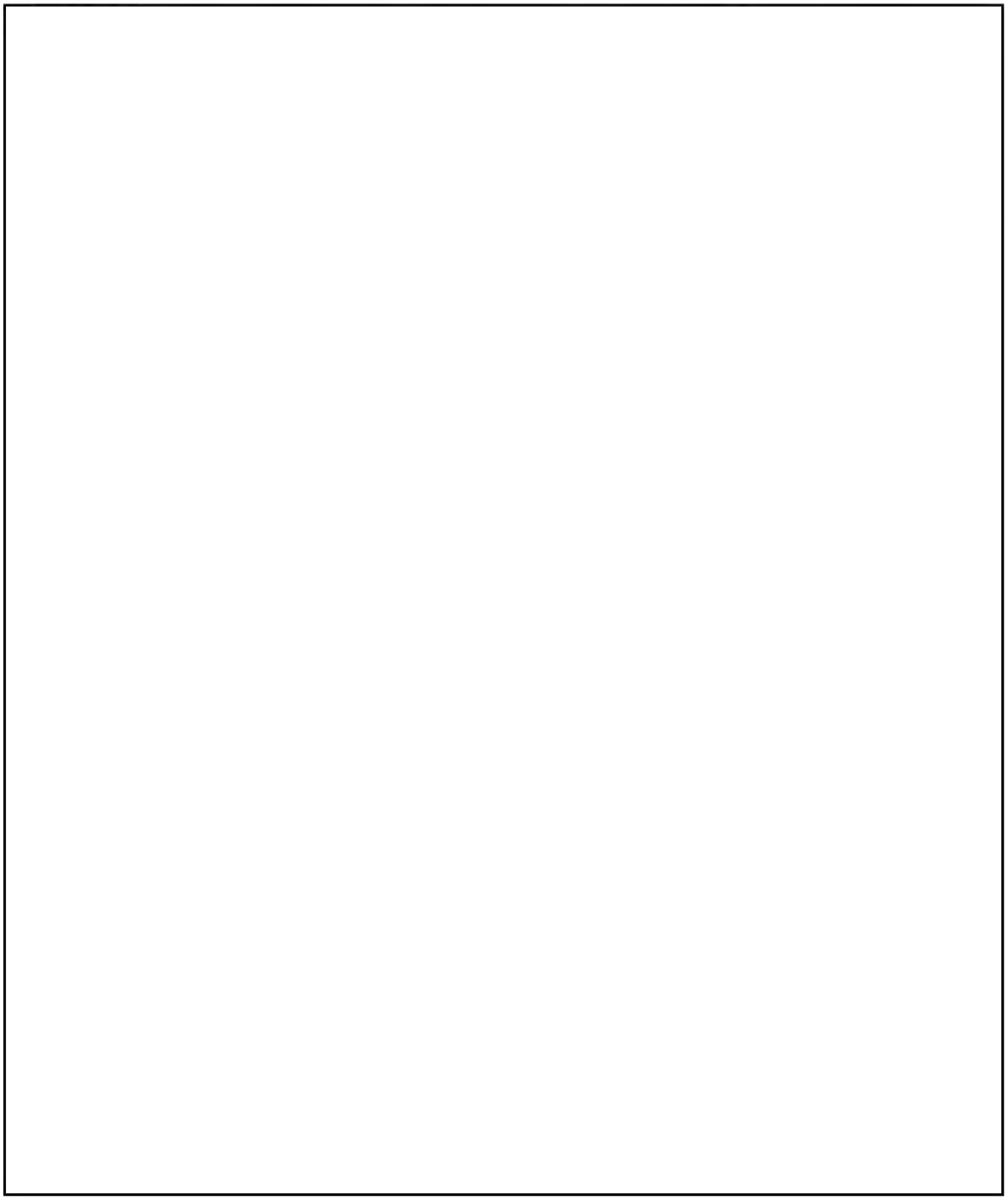
* Studies in Intelligence, Vol. 10, No. 1 (Winter 1966), pp. 23-38.

25X1A [redacted]

and the requisite data, as well as the time, for these are usually lacking.



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ESTIMATING THE SOVIET GOLD POSITION *

25X1A [redacted]

The cloak of secrecy that covers so many Soviet activities is drawn especially tight about statistics on the production and consumption of nonferrous metals and minerals in the USSR. The State Secrets decree of 9 June 1947, as amended in April 1956 and again in 1959, makes it a criminal offense to divulge absolute figures on productive capacity, production plans, and plan fulfillment for nonferrous, precious, and rare metals. Apparently the decree is strictly enforced, for since World War II there has been no known instance of publication of the proscribed data.

If the Soviets forbid the release of information on the production of metals like copper, lead, zinc, and aluminum, it is not suprising that gold production and the size of the Soviet gold reserves should be treated with the utmost secrecy, and these secrets in fact appear to be kept even from many high-ranking officials of the Soviet government. Absolute production figures have not been released since 1927, and gold reserve figures have never been published. In the face of this almost total blackout of official data, anything better than a guess at the size of the Soviet holdings was long considered impossible.

A meaningful assessment of the USSR's financial position, however, requires that a reasonably accurate value be placed on its reserves of gold. The Western estimates which have traditionally ranged from US$6 billion to $12 billion--in a self-confirming circle that does little to inspire confidence in their validity--were not good enough. Better estimates had to be made on the basis of a reasoned examination of all information available to the intelligence community.

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* Studies in Intelligence, Vol. 7, No. 4 (Fall 1963), pp. 1-9.

25X1A [redacted]

First Questionable Construction

The approach that seemed to offer the best chance of success was to begin with fairly reliable estimates that have been made of the Czarist gold reserves as of the end of 1920 and then compute the changes by addition and withdrawal over the following 40 years. An obvious weakness of this methodology is that the results depend upon the accuracy of the 120 component estimates of annual production, consumption, and sales, plus those of other, irregular acquisitions and dispositions. But although the number of errors small and large would undoubtedly be great, it appeared reasonable to expect that those on the high side might roughly compensate for those on the low.

A preliminary survey of available information revealed that satisfactory estimates could be made of gold collections from the population and acquisitions from foreign sources--notably the Spanish gold transferred by the Loyalist government to the USSR "for safekeeping" during the civil war and that of the Baltic and East European countries which came under Soviet control when these became Soviet Republics and Satellites. Information on Soviet sales of gold outside the Bloc was also quite good for all but a few years of the 1920-1961 period. Consumption, almost negligible during the early years, was easily estimated for the period since 1950. Gold production was left as the major stumbling block.

The USSR had published figures on production through 1927 and there was enough additional information to carry the estimates through 1933, but after that the ground was not so firm. Soviet announcements of quarterly and annual percentage increases for the years 1934-1939 had been reported and analyzed, however, by the American Legation at Riga, Latvia. These reports were studied, and with some modifications the estimates were tentatively accepted.

For the period 1940 through 1961 there was almost a complete blank of information, and for a time the problem of estimating annual production in these years seemed insurmountable. But after a number of false starts and some wheel-spinning, data was obtained from a sensitive source that eventually led to the development of an accurate series of production figures for most of the 1940-61 period. With this major obstacle out of the way and various minor problems cleared up, a tentative estimate of reserves as of the end of 1961 could be reached.

Only it seemed this estimate could hardly be right. It was far lower than any made in the past, almost unbelievably low even to those who had never taken the $6-12 billion guesses of Western financial circles seriously--under US$2.5 billion. Moreover, the

reconstruction showed Soviet gold sales in recent years to be considerably larger than current production, requiring the USSR to have been drawing heavily on reserves to finance its annual trade deficits, and such improvidence seemed incredible if the reserves were really so low.

A reexamination of the whole construction was thus called for. Now a shortage of several billion dollars in the reserves figure would have to derive from systematic error in a large number of component estimates over a considerable time; no single estimate or small group could possibly account for such a deficiency. Only estimates of production met this criterion. For a number of reasons that cannot be recounted here, the accuracy of production estimates for the period after 1940 was established within too narrow limits to leave room for any but a small discrepancy, so attention was concentrated on those of the prewar years 1934-1940. Although a close examination of the Riga analysis covering these years showed it to be closely reasoned and the estimates apparently accurate, there were several questions that had not been adequately explored when its figures were tentatively accepted for this study.

The first unresolved incongruity lay in announcements made at the time by the Chief of the Main Administration of the Gold Industry, one Serebrovskiy. Serebrovskiy had declared that gold production increased from about 2.7 million ounces in 1933--a figure also mentioned by Stalin in an interview with a Western journalist--to 10-12 million ounces in 1936 and 14 million ounces in 1937. These latter figures were approximately twice the Riga estimates for those years, and the difference cumulated over 5 or 6 years would yield an increase in reserves of about US$1 billion. Serebrovskiy's claims had been disregarded on the assumption that he was either indulging in propaganda for Western ears or exaggerating for his own ends, as Soviet managers have been known to do; but now it seemed possible that they were true.

The Dal'stroy Problem

The possible vindication of the Serebrovskiy figures would lie in the production of "Dal'stroy," the only gold-producing organization not under the Main Administration of the Gold Industry (Glavzoloto). Dal'stroy, the Construction Trust of the Far North, was organized by the NKVD to make use of the horde of largely political prisoners in the middle thirties for forced labor on the mineral resources of northeastern Siberia. Reports leaking out of Russia told of a vast gold-bearing region along the Kolyma river that was rich beyond the wildest imagination. Prisoners who managed to survive the rigors of the northern winters and the tender mercies of the NKVD told of the death of millions of their fellows in the frantic production of fantastic quantities of gold for the Kremlin's vaults in Moscow.

For all their fiction-like quality, some of these reports sounded credible. One popularized tale of Dal'stroy was a distillation by a Polish army officer of the testimony of over 60 prisoners, including their estimates as to the size of the labor force and the quantity of gold recovered per man. This estimate put Dal'stroy's output at almost 13 million ounces in the year of highest production. Another account, written by a former prisoner assigned to a Dal'stroy factory which made boxes for shipping the gold, used the quantities of boxes produced to calculate that more than 6 million ounces of gold was shipped in the peak year. Other eye-witness accounts of a similar nature gave estimates of the same order. These stories had been discounted for a number of reasons, but now the suspicion arose that they might be somewhere near the truth. Although production in Dal'stroy could hardly have matched the exaggerated guesses of 10-20 million ounces annually, it might have reached the more conservative reports' 5-6 million ounces. If so, the Rigra estimates obviously were low.

Doubts about the Riga reports were increased by the fact that, in spite of the sensational aspects of the Dal'stroy operation and the certainty that it was producing gold, they made no mention of it. Even more significant, Riga's breakdown of production by producing area left no room for Dal'stroy, as though the analysts were not aware of the operation or else deliberately ignored it. Most of the data used for the Riga estimates were those published by Glavzoloto, and it could be argued plausibly that Glavzoloto's production figures would not include Dal'stroy production because Dal'stroy was not under its administration. If this was the case, Dal'stroy's production was not represented in the Riga estimates, and if Dal'stroy's production had been very large, as large say as that of Glavzoloto, the total annual gold production in the USSR would have been on the order of the 10-12 million ounces that Serebrovskiy claimed.

These considerations launched a search for some way to establish the magnitude of Dal'stroy's output in the 1930's and, concurrently, for any proof as to whether the Riga estimates were really estimates of total Soviet production including that of Dal'stroy or estimates of Glavzoloto's production only.

Resolution

It was known that Dal'stroy's output in the 1950's prior to its dismemberment in 1957, had been approximately 1.25 million ounces annually. Finding some link between this level and the magnitude of its output in the 1930's was therefore a possible approach to the determination of the latter. An intensive search was begun for a Soviet statement comparing Dal'stroy production in the two periods.

Such a comparison, it was felt, might have been made quite innocently; there would be no reason to suspect in the USSR what a revelation it would be.

The search succeeded in uncovering two partial links. The first was a statement that in 1958 the Western Directorate of the former Dal'stroy, now of Magadan Oblast, produced "not less" than it had produced in any of the previous 30 years of its existence. The Western Directorate's 1958 production was on the order of 385,000 ounces, roughly one-third of total output in the former Dal'stroy region in that year. Now if the Western Directorate, in accordance with this statement, produced not more than about 385,000 ounces annually in the 1930's, a total Dal'stroy production in the 1930's on the order of 5-6 million ounces annually would require production in each of the four other gold-producing directorates in Dal'stroy to have been very much greater than that in the Western Directorate, averaging more than 1 million ounces each. While not impossible, this asymmetry seemed highly improbable. Every scrap of evidence available suggested that all five had occupied positions of almost equal importance in the Dal'stroy structure prior to 1952. If, on the other hand, production in the other four directorates in the 1930's had averaged about the same as that in the Western, total production in Dal'stroy in the peak prewar year could not have been more than 2 million ounces.

The second link between the thirties and fifties was found in the gross industrial index of Magadan Oblast, where three-quarters of the Dal'stroy gold was mined in the postwar period. This index showed that the Oblast's industrial production in 1950 was slightly greater than in 1940 in spite of the fact that the output of large-scale industry had remained at the same level and the output of a number of industries, including timber and brick, had declined by 1950. It is unlikely that the 1950 gross industrial index could have shown an increase over 1940 if the output of gold in Magadan had fallen significantly over the decade, particularly when that of other fairly important industries had declined. Production of gold constituted much too large a share of Magadan's total industrial output not to affect it.

It therefore seemed unlikely that Dal'stroy's production in the 1930's could have been 5-6 million ounces annually. The foregoing evidence, felt to be considerably stronger than the hearsay of prisoners who had at best a very limited view of the operation, indicated that Dal'stroy's major extraction areas, including the famous Kolyma, produced from 1.5 to 2 million ounces in the prewar year of highest output. At $35 an ounce Dal'stroy's contribution to Soviet reserves over the crucial 6-year period in the 1930's was thus more nearly on the order of US$300 million than a billion.

Although this conclusion leaves Serebrovskiy's claims unexplained, it reinforces the earlier supposition that they had some other motivation than diligence in honest reporting. In retrospect, Serebrovskiy's behavior opens his reliability to serious question. On 1 May 1935 he declared that the USSR would achieve first place in world gold output in 1940. Six months later, 11 November, he said that first place could be reached in 1937. Then just 17 days later, on 28 November, he claimed that it would be reached in 1936, the coming year. Thus in less than seven months he moved attainment of the goal of 10-12 million ounces annually ahead four years. Either a bonanza of incredible magnitude had been discovered or he was a thoroughly misled or frightened man. That it was the latter may be indicated by events a little more than a year thereafter, when Serebrovskiy, along with many other senior officials of Glavzoloto, was removed from office and never heard of again. Soviet statements at the time supplemented the usual accusations of anti-state activities against these officials with specific charges of exaggeration, mentioning in particular the practice of counting gold believed to be present in mined but unsmelted ore.

Although Dal'stroy's peak production now appeared to have been no more than 1.5 to 2 million ounces a year, the question whether this output was included in the Riga total of 5 to 6 million ounces for the peak prewar years was still of some importance. Against the negative evidence in Riga's failure to mention Dal'stroy and listing an "all other" category in the distribution of production not large enough to include Dal'stroy output, it was discovered that this distributive breakdown was "forced," that is total production was estimated independently of any area figures and then distributed, sometimes quite arbitrarily, among the various sectors. The size of the "all other" category was therefore not a valid test of whether Dal'stroy's output had been included. Moreover, if the Soviet announcements of annual percentage increases on which Riga based its estimates referred, as must be supposed, to total production, Dal'stroy's output would have been included in the Riga estimates whether or not Riga was aware of it.

There is also positive evidence that Riga's estimates included Dal'stroy production. An American engineer, Arthur Littlepage, who had been Deputy Chief Engineer in Charge of Production in Glavzoloto through mid-1936, returned then to the United States and collaborated with a professional writer in preparing an account of his years in the USSR. Not long after the book was published he died, but his collaborator was interviewed in the hope that Littlepage might have left notes with him or at very least told him something about levels of production. He was unable to provide any additional information; he said that Littlepage had purposely avoided publishing production figures out of concern for the safety of his Russian colleagues, many of whom had already been arrested or were under suspicion in the purge of the gold industry that began just after he came back.

This fear of hurting his colleagues would have been misplaced if his published statements regarding production would have confirmed theirs, but if his testimony would have contradicted the high production claims of Serebrovskiy, his concern is understandable.

Littlepage did leave one concrete piece of evidence on production levels. A memorandum of conversation describing his debriefing by members of the Federal Reserve Board records his saying that he had seen the final official plan figures for gold production in 1936, that production did not reach 6 million ounces in that year, and that he did not believe it could have expanded very much in the following years, partly on account of the purges. Moreover, Littlepage at this debriefing was shown an article in an American mining journal which estimated the production of gold in the USSR and broke it down into Glavzoloto and Dal'stroy output. Its figures were in line with the conclusions we have reached above about the magnitude of Dal'stroy's production and with Riga's estimates of total production. Littlepage read the article and declared that it was essentially correct.

A monograph published in 1958 by a Soviet authority on gold production, furthermore, used the same index on which the estimates in the journal article were based to show the increase in the USSR's gold production in the 1930's. This citation of the index in 1958 is probably another confirmation of the article's estimates of production and, indirectly, of the Riga estimates: it is highly unlikely that an authority writing almost 30 years later would use an index that reflected only one-half of Soviet output.

Conclusions

With the acceptance of the validity of the Riga estimates of production in the 1930's, the last serious question regarding the estimate of reserves was removed. Incredible or not, the analysis indicated that Soviet 1961 gold holdings were short of US$2.5 billion, nothing like the $6-12 billion estimate still held by Western financial experts.

The experience gained in reaching this assessment does not point to the development of any standard technique or methodology. The important thing seemed to be a thorough exploitation of all sources and pursuit of every however unpromising lead. Though only about five percent of the leads proved fruitful, those that paid off did so handsomely. Sources ran the gamut from the observations of a Yakut panning for gold in one of several thousand streams in Siberia to reports from the highest levels in Moscow.

One lesson learned in the research was the unreliability of low-level eye-witness reports. Only a small percentage of those bearing on this

problem were accurate, and there was no way, except in retrospect, of distinguishing these from the many inaccurate ones. Published Soviet data, too, proved at times inaccurate and conflicting, although there was no indication that figures put out by Soviet statistical offices were intended to mislead.

Statements by government officials, however, were another matter. As we have said, Soviet officials have in no known instance revealed publicly the true order of magnitude of either gold production or reserves. On the contrary: from the days of Serebrovskiy to the Khrushchev visit here in 1959, when members of his entourage declared that Soviet gold reserves amounted to US$8 billion and were being increased by $650 million annually, the consistent goal of official utterances has been to create the image of wealth.

Yet in the realm of deeds Soviet behavior has been much more appropriate to a nation with limited and dwindling gold reserves. The USSR has frequently foregone attractive trade offers when its efforts to obtain long-term credits failed, has lost desired deals by insisting on barter arrangements, and has been searching among its products for additional foreign exchange earners. And finally, during certain negotiations on an international gold reserve to which each nation should contribute ten percent of national reserves, Soviet representatives offered, not the $1 billion appropriate to these public claims, but $250 million, around ten percent of our foregoing estimate of their reserves.

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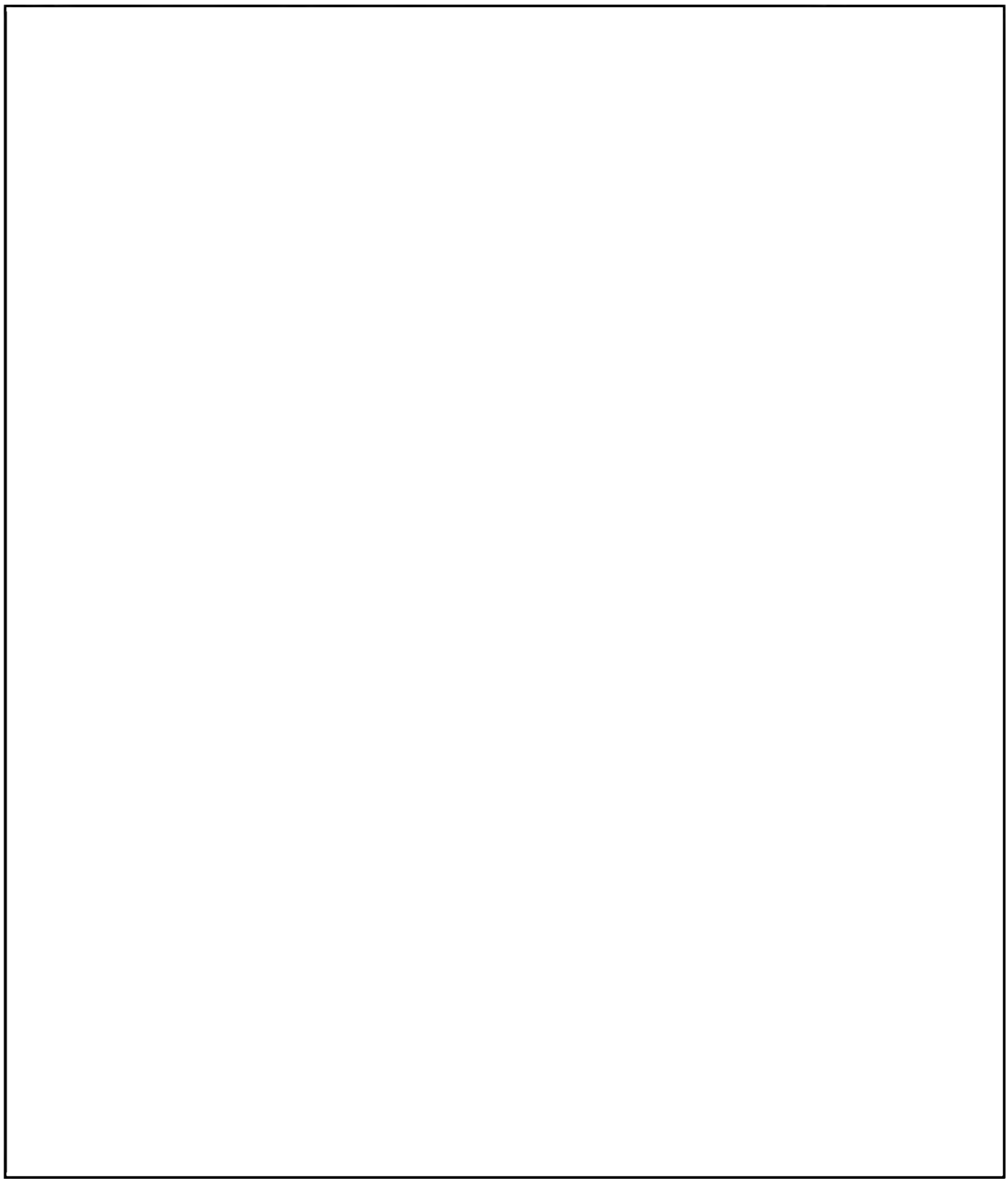

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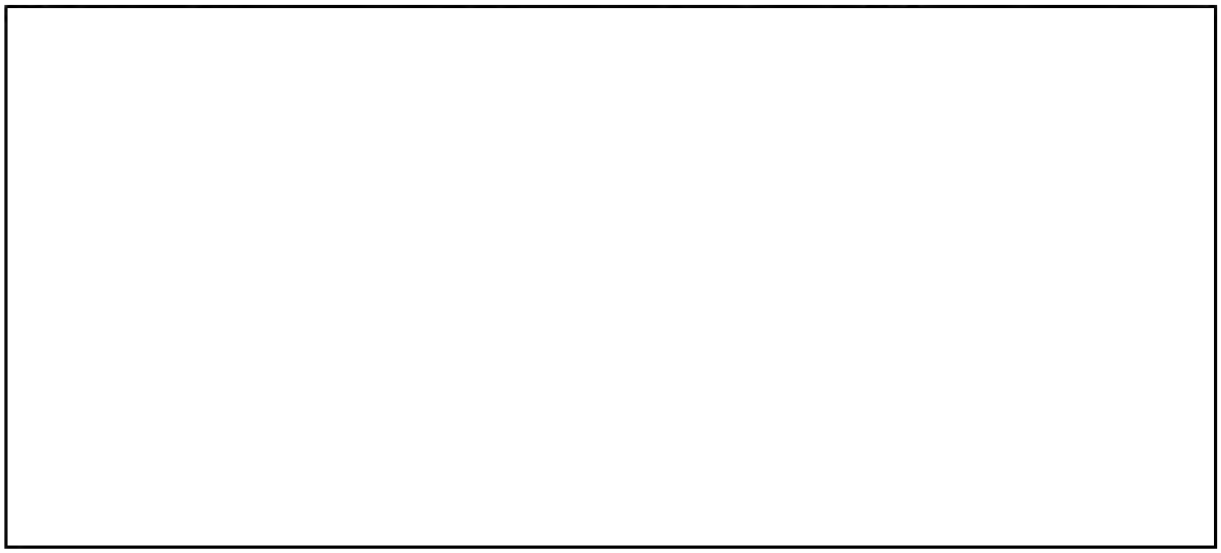
Pre-Blackout Data

The basic store of information on Chinese industry goes back to before the Communist takeover in 1949; much of the mainland industrial base was established by them. The huge iron and steel complex at Anshan and many of the varied industrial activities at Shanghai and Wuhan and in other widespread areas were developed by the Japanese during their occupation. Then many plants damaged in the war were restored or reactivated, some with U.S. assistance, between 1945 and 1949, so that much information is available on these from Chinese Nationalist, Japanese, and U.S. sources.

During the first 10 years of the Mao regime, when there was a great deal of industrial expansion and modernization, the Communists reported openly about the progress they were making. This information was by and large reliable; the achievements of the Communists in this period, compared with the Nationalists' record, were impressive enough to need no embellishment. A considerable amount of accurate information thus came out of China up to 1959.

When in 1959 the Communists attempted to make it in one great leap to the forefront of the industrial nations of the world, they not only established completely unattainable goals but also reported incredible progress towards them. Almost all of the information they issued at this time was impossibly warped or exaggerated. Even so, placed against the previous reporting, it gave some insight into actual accomplishments. When the great silence enveloped the country in 1961, therefore, a good basic reservoir of data on the industrial establishment was available to the economic intelligence officer.



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TONNAGE THROUGH TIBET *

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A more than routine interest has recently been focused on problems of highway logistics by the Communist Chinese threat along the northeastern border of India. The magnitude of this threat depends in large part on the Chinese ability to move military supplies by road from railheads deep in China to the areas of conflict; air transport, the only alternative, is at present not available to the Chinese in significant capacity. It was therefore possible to make an estimate of the threat, in terms of the size of the military forces that could be supplied, by computing the capacity of the roads, setting this against the supply requirements of the forces actually in Tibet, and so determining what excess capacity was available to support additional troops in operations against India. Two other possibly limiting factors had also to be calculated--the number of trucks needed to move the supplies, and the amount of petroleum required to fuel the trucks. The methodology for these calculations, described in the following pages, can be used to estimate the size of military force that can be supported in other campaigns dependent on supply by road.

Roads to the World's Roof

The Chinese forces at the front lines on the Indian border were at the end of roads that wind 700 to 1,800 miles over high and rugged terrain. The three main access routes to Tibet are indicated on the accompanying map. The most important of these is the Tsinghai-Tibet highway running south from Golmo to Lhasa. Golmo can be reached by road either from the railhead in the vicinity of Hsia-tung on the trans-Sinkiang railroad or from that at Hsi-ning west

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* Studies in Intelligence, Vol. 7, No. 2 (Spring 1963), pp. 13-25.

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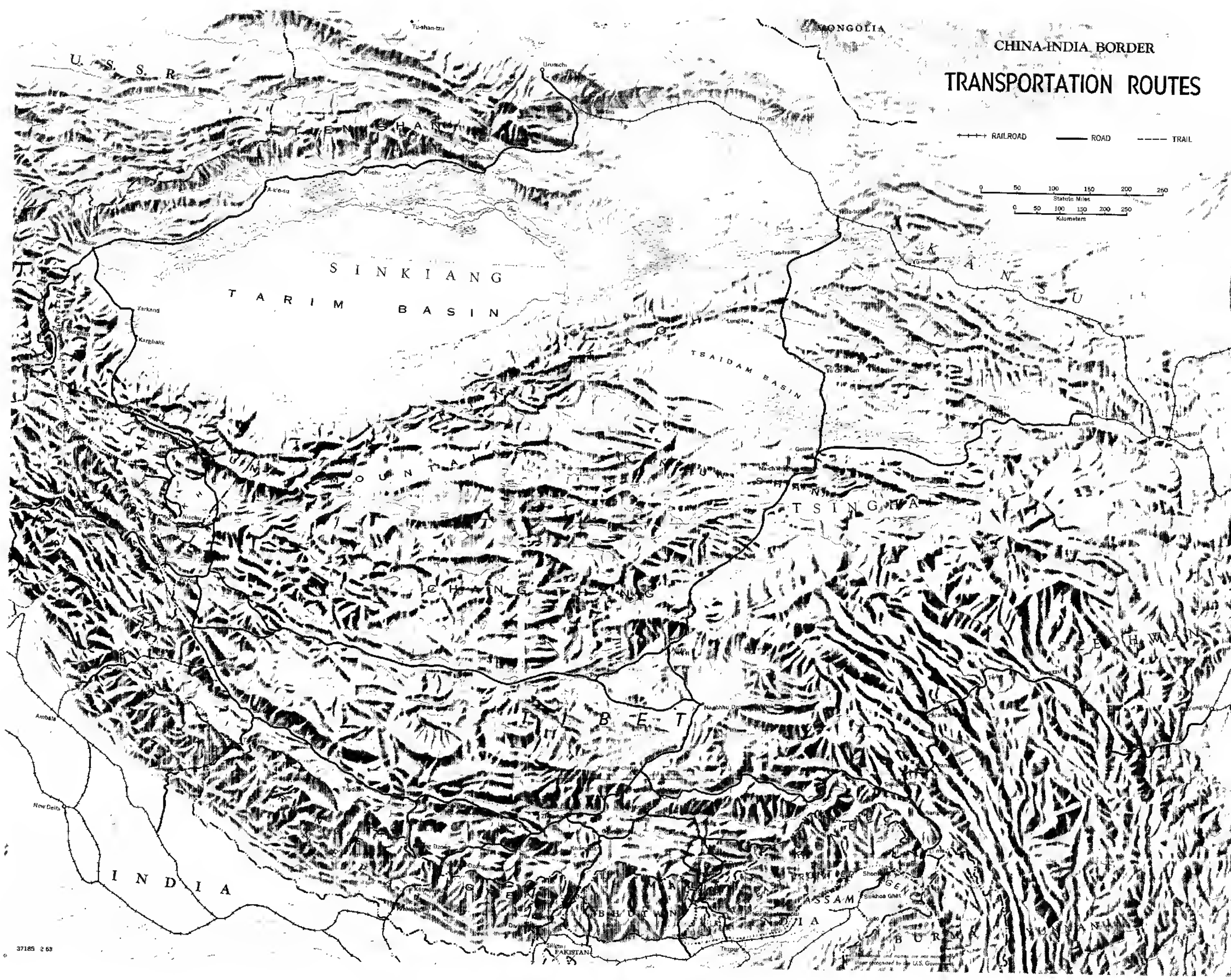

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of Lan-chou. The major route for the movement of supplies appeared to be the former, from the Hsia-tung area southward through Golmo for about 1,000 miles to An-to or 1,300 miles to Lhasa. The average elevation of this road from Golmo on is about 14,000 feet. Troops along the western border of the North East Frontier Agency, those in the Chumbi Valley opposite Sikkim, and those located as far west as the southern part of Ladakh were supplied by this route.

The other two routes, supplying the extreme flanks, are about equal in importance to each other. The Szechwan-Tibet highway, running west from the railhead at Ch'eng-tu in Szechwan Province, served the troops in the Ch'ang-tu area and the eastern border of NEFA. It goes on from there to Lhasa, a total distance from Ch'eng-tu of about 1,200 miles, over extremely rugged terrain ranging to 12,000 feet in elevation. The third route runs from the railhead in the Urumchi area in northwestern China southwest to Kashgar, then southeast to the Ladakh area. From Urumchi to Rudog it covers about 1,340 miles at elevations ranging from 3,500 feet in the northern portions to between 11,000 and 16,000 feet in the south.

The combined practical forward capacity of these access routes under ideal conditions was figured at 2,000 short tons per day--1,000 tons delivered to Lhasa via Golmo on the Tsinghai-Tibet highway, 500 tons delivered to Ch'ang-tu from Szechwan for the eastern flank, and 500 tons delivered over the Kashgar-Rudog road for the Ladakh front. These main access routes are supplemented by roads leading forward to the frontier and subsidiary east-west and north-south routes to a total of some 7,500 miles.

Development of a Methodology

By the mid-1950's policy makers as well as transportation intelligence specialists had become greatly concerned about the wide divergence in estimates of the capacities of identical transportation routes and facilities published in supposedly definitive U.S. and UK intelligence reports. These estimates were important to policy makers as a basis for determining the size of enemy forces that could be deployed and supported in various areas of the world. Without a common understanding of the factors which entered into the calculation of the capacities of the various forms of transportation, however, it had been impossible for the specialists who made the estimates to arrive at reasonably uniform conclusions. The disparities confused and irritated the policy makers.

As a consequence, the Subcommittee on Transportation of the Economic Intelligence Committee, composed of transportation specialists of

the U.S. community, undertook a series of studies which led to the formulation of methodologies for estimating the capabilities of railroads, roads, ports, and inland waterways. * These were then sent to [redacted] 25X1C
After much consultation and exchange of correspondence, working-level agreement on the method for computing railroad capacity was reached in 1960 and on that for computing road capacity in 1961. These methods were subsequently approved by the logistics specialists who provide intelligence support for SHAPE and are now widely used by the intelligence components of NATO countries.

In the U.S. government the task of estimating road capacities for intelligence purposes is performed primarily by the intelligence components of the Department of Defense. The estimate of 2,000 tons as the capacity of the major supply routes into Tibet was made originally by DOD analysts by these now standard methods and accepted by other components of the intelligence community. The process is described in brief below.

One begins with the ideal capacity of a road of a given type of surface in perfect condition and good weather, straight, and without traffic hindrances. On paved roads 5-ton trucks are assumed to move at 25 miles per hour spaced 300 feet apart to allow for the "concertina" (compression wave) action inherent in any continuous truck convoy operation. On unpaved roads the dust hazard requires increased spacing and decreased speed. A simple calculation gives the number of trucks that can be moved in both directions during a 24-hour period, considering only the speed, the interval between vehicles, and type of surface.

This basic capacity is then reduced to obtain what is known as operational capacity, which makes allowance for the constraints imposed by driver inefficiency, vehicle casualties, essential maintenance enroute, and unforeseen operational developments. These contingencies are estimated to reduce the basic capacity by 20 percent. A practical capacity is obtained by applying further reduction factors to the operational capacity to take into account the following:

Less than ideal road characteristics;

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* For a detailed explanation of these methodologies, see Department of the Army Field Manual FM 55-8, Transportation Intelligence, December 1961.

Turning and crossing operations, including delays caused by convoys entering and leaving the highway and the movement across the highway of other essential traffic, civilian and military;

Operational phasing, including the constraints created by administrative and civilian vehicles, stops for meals, refueling, driver rest periods, and the reduced efficiency of night operations.

The resulting practical capacity is expressed in vehicles per day traveling in both directions. Multiplication by the net load per truck, in this case 3 tons, gives the daily tonnage in both directions, and half of this is the practical forward capacity of the road in tons per day.

The value of the several reduction factors has been derived from engineering data on highway transportation and capacity, taking into account vehicle performance and road design, construction, and maintenance. Where precise data were not available on certain types of roads, the experience of highway transport specialists and engineers in truck convoy operations was consulted in assigning values.

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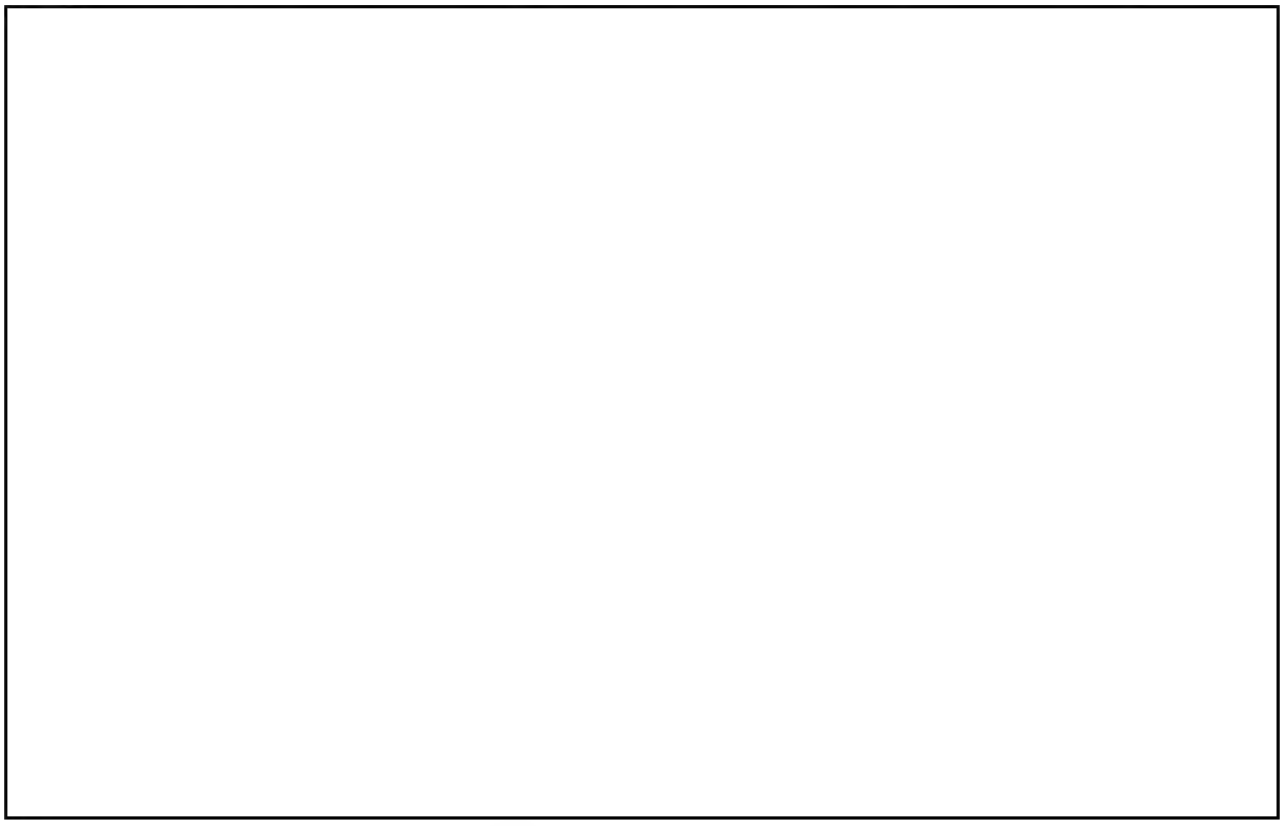

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resupply requirement in tons the following:

Class I (Rations)	23.6
Class II and IV (General Supplies)	21.5
Class III (Petroleum Products)	3.1
Class V (Ammunition)	28.0
Total	76.2

On the average, however, the requirements for the forces in Tibet were lower per man than implied in this example. Other troops organized in independent infantry regiments had an estimated requirement for only 22.6 tons per regiment, and border defense regiments required even less. Some troops in garrison were estimated to be using no ammunition.

It is possible that the Chinese had stockpiled considerable amounts of supplies during the summer in anticipation of their fall offensive against India, and the amount transported to Tibet during November could therefore have been considerably less than 430 tons per day. If, however, the fighting had continued at that level for any length of time, the requirement for road transport would have eventually reached the estimated level.

Vehicle and Fuel Requirements

No coordinated methodology like that for computing the capacity of roads exists for estimating the number of trucks needed to deliver the required supplies nor for computing the fuel requirements of the trucks. Of the several methods used in making such estimates, one which appears to give uniformly good results is described below. *

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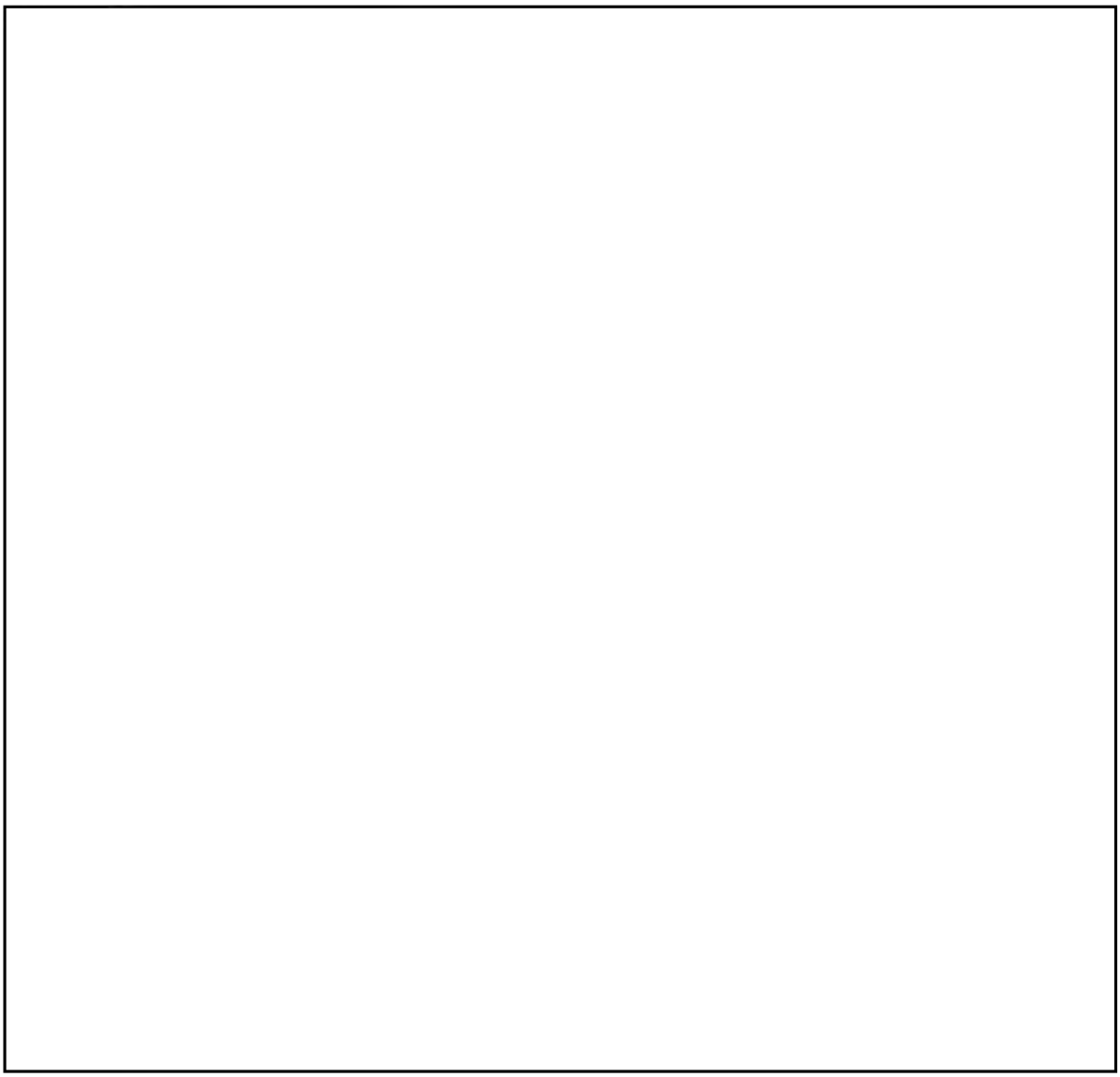

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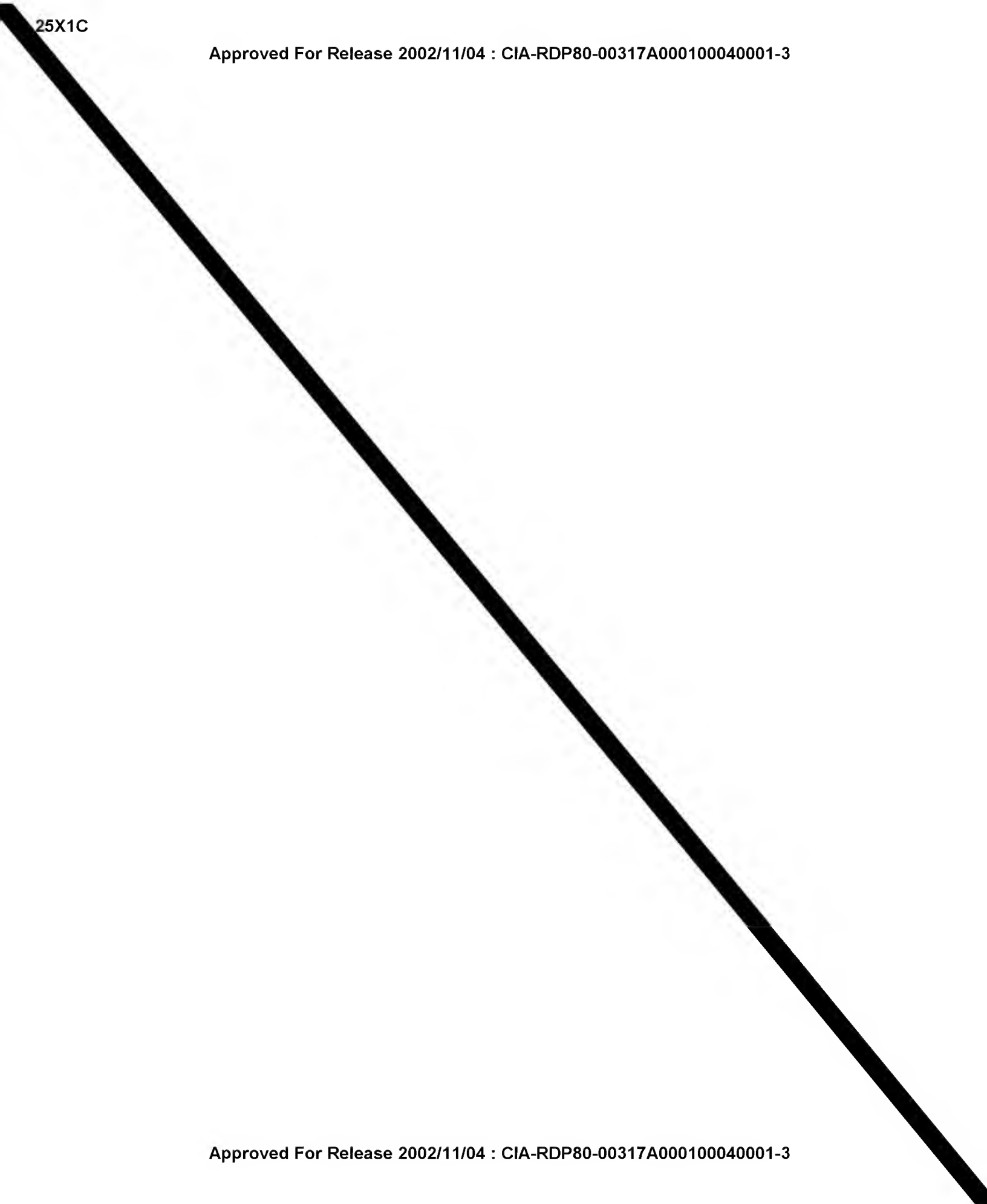
** Another method, used by DOD analysts, which gives approximately the same results is to make a separate calculation for (1) the amount of gasoline used to haul the supplies, (2) the amount of gasoline used to haul the gasoline for the supply trucks, (3) the amount of gasoline used to haul the gasoline used in (2), and so on until the figure becomes insignificant. When the total amount of gasoline required has been obtained, it is added to the tonnage of supplies, and the computation for the number of trucks required is completed.



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Truck and Fuel Availability

Because Communist China is not yet self-sufficient in the production of motor fuel, trucks, and spare parts, both the petroleum industry and motor truck transport being in comparative infancy, this aspect of the logistic problem was given special attention. The extreme length of the supply lines from railheads to the areas of troop concentration on the Indian border made both the amount of gasoline required and the number of trucks needed of significant proportions; the gasoline required to haul supplies 1,300 miles was calculated to be nearly equal to the tonnage delivered. The delivery to the troops of about 430 short tons of supplies daily during November 1962 required about 400 short tons of motor fuel daily and a truck park of about 7,000 vehicles.

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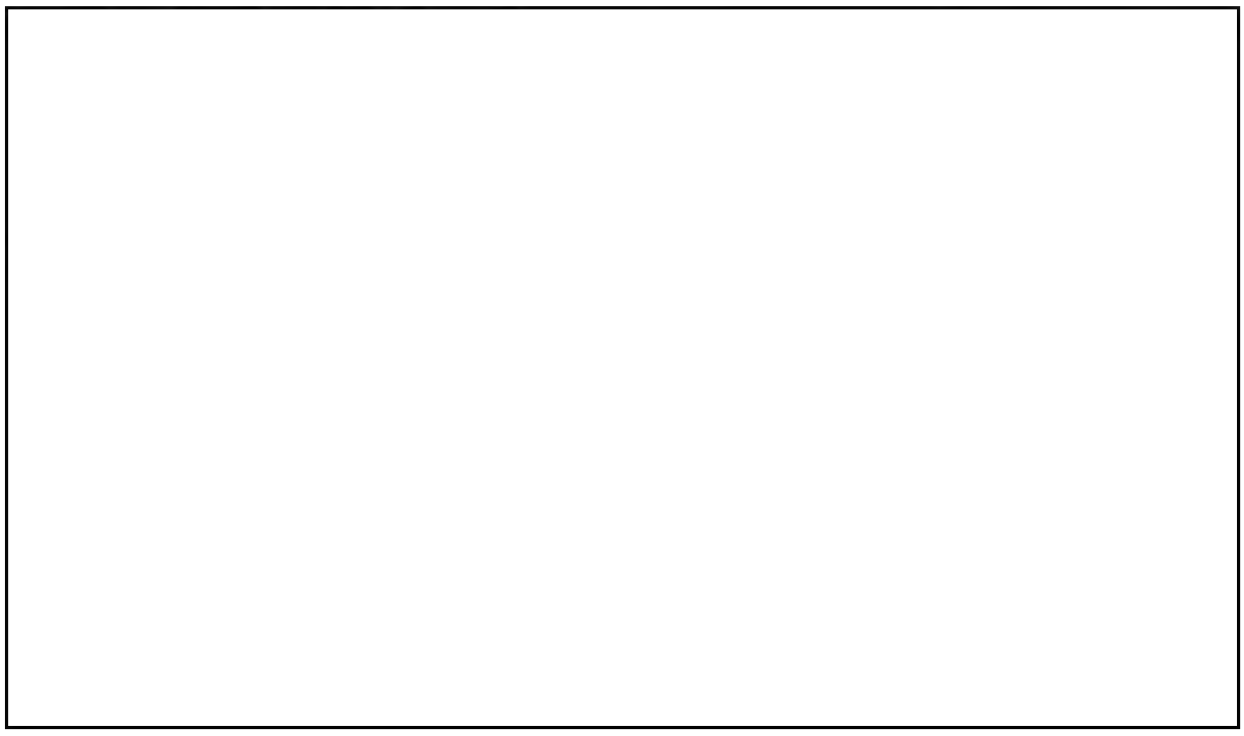

It was estimated, however, that the total availability of petroleum products in Communist China in 1962 was about 6.8 million short tons, about 1.4 million of which consisted of motor gasoline. The daily requirement for about 400 tons for the Tibetan front, projected as an annual requirement of about 146,000 tons, would thus be only slightly more than 10 percent of the motor fuel available in 1962. Refineries are located near two of the major access routes: those at Leng-hu, Yu-men, and Lan-chou, not far from the central route to Lhasa, were undoubtedly the source of the gasoline used on that route, and the Tu-shan-tzu refinery near the Karamai oil field in Sinkiang was probably the major source of supply for that used on the route to Ladakh. Thus it appeared that the fuel requirements for the Tibetan fighting were tolerable and the sources of supply convenient. Undoubtedly special military allocations were necessary, however, with resulting cutbacks in other sectors of the economy.

It was estimated that at the end of 1962 the military and civilian truck parks of Communist China each consisted of about 100,000 trucks in operating condition. The size of the civilian truck park is believed to have been reduced from previous years because truck production nearly ceased during 1961 and 1962 and difficulties were experienced in producing or importing spare parts. Present production and imports are about sufficient, however, to maintain the combined park at the 200,000 level. In the military regions of Tibet, Lan-chou, and Sinkiang there were more military trucks available in November 1962 than the estimated 7,000 required to transport military supplies and gasoline. In addition several thousand civilian trucks which are normally employed for economic activities in the provinces of Kansu, Sinkiang, and Tsinghai could have been diverted quickly to the military supply lines if needed.

Leeway for Expanded Operations

The table on the following page was compiled by using the methodologies described above; others broke the daily supply requirement down into that required by troops engaged in combat and that for those not so engaged. It was tentatively concluded in November that military traffic occupied about 20 percent of the capacity of the roads to the front lines from the supply bases in Tibet and about one-third of the combined capacity of the major access routes. It was therefore estimated that the forward roads could support the daily resupply requirement of more than five times the number of troops then in frontline combat units and that the access routes from the railheads could handle more than three times the quantity of supplies then required by the troops located in the whole of Tibet.

More recently it has been estimated that the 105,000 Chinese troops currently in Tibet would have a daily supply requirement of 450 tons during the type of fighting that occurred last November. It has also been estimated that the Chinese may wish to reserve as much as 450 tons per day of the capacity of the roads for support of an air force in Tibet. These requirements, plus an allowance for the trucks that would have to provide petroleum for the operation of the trucks moving supplies, would leave a surplus capacity amounting to about 400 net tons per day that could be used to support additional troops deployed to Tibet. The total ground force strength that could be supported there, according to this estimate, would be on the order of 200,000 men, a maximum of about 15 divisions.

SUPPLIES REQUIRED BY TROOPS IN TIBET, * BY ACCESS ROUTE AND MILITARY DISTRICT

Route and District	Troops	Daily Resupply Requirement: Class I, II & IV (tons)	Class III (tons)	Class V (tons)	Total (tons)	Distance (miles)	Transport Requirements: Trucks	Fuel (tons)
Tsinghai-Tibet Highway								
A-li	5,600	17.4	4	9.3	30.7	1,800	821	50
Zhikatse - Chiang-tzu	17,000	52.7	6	...	58.7	1,500	1,160	70
Shan-nan	13,000	40.2	6	28.0	74.2	1,600	1,608	90
Lhasa	16,000	49.6	10	...	59.6	1,300	988	60
Sub-Total	51,600	159.9	26	37.3	223.2		4,577	270
Szechwan-Tibet Highway								
Ch'ang-tu and Lin-chih	34,000	102.0	11	18.6	131.6	700	1,039	60
Urumchi-Rudog								
Hotien	17,000	52.7	7	18.6	78.3	1,300	1,284	70
Total	102,600	314.6	44	74.5	433.1		6,900	400

* As of 17 November 1962

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DCID No. 3/1
(New Series)

APPENDIX A

DIRECTOR OF CENTRAL INTELLIGENCE DIRECTIVE NO. 3/1[1]

PRODUCTION AND COORDINATION OF FOREIGN ECONOMIC INTELLIGENCE

(Effective 23 April 1965)

Pursuant to the provisions of NSCID Nos. 1 and 3, and for the purposes of strengthening the over-all governmental intelligence structure and ensuring the effective production and coordination of foreign economic intelligence relating to the national security, the following policies and operating procedures are hereby established.

1. Policies

In carrying out their foreign economic intelligence activities and responsibilities, and in order to effect appropriate coordination in the production and exchange of foreign economic intelligence, the interested departments and agencies shall apply the following basic principles:

a. No complete separation of interests is possible or necessarily desirable in economic intelligence activities.

b. Full and free interchange of all pertinent information, finished intelligence, and schedules of research programs, including external research, among interested departments and agencies is essential.

c. No one department or agency is considered to be the indisputable authority in any field.

d. Each department or agency, taking full cognizance of the facilities of the other agencies, shall maintain adequate economic intelligence research facilities to accomplish its departmental intelligence production mission and to provide such additional economic intelligence within its field of primary responsibilities as may be necessary to

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[1] This Directive supersedes DCID No. 3/1 (New Series) of 25 July 1963.

satisfy other requirements relating to the national security. Any department or agency may make such studies as it believes necessary to supplement the intelligence produced by other departments and agencies. However, basic research studies should not normally be undertaken or disseminated outside the producing agency without consultation with the department or agency having primary responsibility for the subject matter involved.

e. The United States Intelligence Board (Intelligence Board) component of each department or agency having technical services or other facilities with intelligence production capabilities shall endeavor to coordinate the intelligence activities of such service or facilities with the work of the Intelligence Board agencies and to make available to those agencies the intelligence produced by such services and facilities.

2. Allocation of Primary Production Responsibilities

a. The following division of interests shall serve as a general delineation of primary responsibilities for the production of economic intelligence of common concern:

(1) Production of military-economic intelligence on all foreign countries, including by way of illustration intelligence on military requirements, military materiel production, shipbuilding and ship movements, logistic capabilities, and particular aspects of economic strength or weakness directly related to military capabilities, is the responsibility of the Department of Defense.

(2) Production of intelligence on all foreign countries on political and social aspects of economic organizations and institutions such as trade unions, and on the relationships between political and economic policies, is the responsibility of the Department of State.

(3) Production of all economic intelligence on the Sino-Soviet Bloc[2] is the responsibility of the Central Intelligence Agency except as indicated herein. In addition, it will supplement the intelligence produced by other agencies by conducting such analyses and studies as may be necessary to produce integrated economic intelligence on the Bloc.

(4) Production of all economic intelligence on foreign countries outside the Sino-Soviet Bloc is the responsibility of the Department of State except as indicated in paragraph 2a(1).

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[2] As used herein, "Sino-Soviet Bloc" includes USSR, Communist China, North Korea, North Vietnam, Albania, Bulgaria, Czechoslovakia, Hungary, Poland, Rumania, and Soviet-occupied portions of Germany.

b. Despite the above-mentioned allocations of primary production responsibilities, there are areas of common or overlapping interest (including, for example, Sino-Soviet Bloc economic policies and doctrines, economic cost studies of Bloc military programs, East-West trade, Sino-Soviet Bloc economic activities in non-Bloc areas, and transportation) which require continuing interagency liaison and cooperation.

c. The existing allocations of production responsibility for National Intelligence Surveys (NIS) are not changed by this Directive even though such allocations may, in some instances, be at variance with department or agency responsibilities specified in paragraph 2a. However, the Economic Intelligence Committee (EIC) may, on occasion, examine such allocations and make appropriate recommendations to the NIS Committee.

3. Responsibility for Economic Intelligence Coordination

a. To assist the Director of Central Intelligence in carrying out his responsibilities with respect to coordination, the EIC of the Intelligence Board shall:

(1) Review from time to time the divisions of responsibility indicated herein, determining how the provisions of this Directive apply, particularly in areas of common or overlapping interest, and recommending to the Intelligence Board appropriate changes in these divisions of responsibility.

(2) Periodically survey the facilities and arrangements available to support the production of foreign economic intelligence relating to the national security and make recommendations to the Intelligence Board concerning such improvements as may require Intelligence Board action.

(3) In order to minimize the duplication of effort and expense: prepare and circulate consolidated periodic lists of intelligence studies and related research being conducted within the Government on the economies of foreign areas; and review external research projects individually involving more than $5,000 and sponsored by departments or agencies in support of economic intelligence production. Departments and agencies shall submit descriptions of the scope of such projects to the EIC and the EIC shall endeavor to present its recommendations in advance of final approval by the contracting department or agency. In its periodic reports to the Intelligence Board, the EIC shall include a summary of actions on these projects.

(4) Review the needs for economic research and analysis pertaining to foreign areas and of importance to the national security, and develop ways in which improvements could be made.

(5) Make such special reviews of economic intelligence collection requirements and of the distribution and processing of economic intelligence information as may appear useful, and develop ways in which improvements could be made.

(6) Ensure that, on intelligence matters affecting the national security, the intelligence community is supported by the full economic knowledge and technical talent available in or to the Government.

(7) Produce, as appropriate, interdepartmental economic intelligence on subjects which transcend the competency of a single department or agency. Arrange, as appropriate, for the coordination of individual Intelligence Board agency reports deemed of sufficient national security importance to warrant the solicitation of concurrences from the representatives of other Intelligence Board agencies.

b. The Central Intelligence Agency and the intelligence components of the Departments of State, Defense, Army, Navy, and Air Force and the National Security Agency shall each furnish one member and an alternate to the EIC. Any other department or agency whose interest or competence may be relevant to problems under consideration may also be invited to participate in the work of the EIC. The representative from the Central Intelligence Agency shall serve as Chairman, and the Central Intelligence Agency shall provide the Secretariat.

c. In carrying out its responsibilities, the EIC shall set up such subcommittees and working groups as may be judged necessary.

d. The Chairman of the EIC through liaison with the Chairmen of SIC, GMAIC, and JAEIC shall seek to avoid unnecessary duplication and shall ensure that adequate attention is given to the economic aspects of intelligence questions in areas of joint or overlapping concern.

e. Any matter may be referred to the Intelligence Board at the request of any member department or agency.

APPENDIX B

MISSIONS AND FUNCTIONS OF OER COMPONENTS

I. COMMUNIST RESEARCH AREA

The Communist Research Area is responsible for producing all-source economic intelligence on all Communist countries (with the exception of North Vietnam and Cuba); for contributing to the coordination of such intelligence production within the US Government; and for contributing within its field of responsibility to National Intelligence Estimates, reports of USIB committees, and National Intelligence Surveys.

A. CHINA DIVISION

The China Division is responsible for producing, in collaboration with other OER Divisions, all-source economic intelligence on Communist China, North Korea, and Mongolia; for contributing to the coordination of such intelligence production within the US Government; and for contributing within its field of responsibility to National Intelligence Estimates, reports of USIB committees, and National Intelligence Surveys.

The responsibility of this Division includes, generally, the provision of economic intelligence on the following: national output, investment, and economic growth; economic policy, planning, and administration; economic impact of military and space programs; fuels and power; manufacturing and mining; agriculture and food supply; internal transportation; domestic and international trade and finance; consumer welfare and standard of living; and human resources -- including population, manpower, and employment.

1. China-North Korea Branch

The China/North Korea Branch is responsible for producing, in collaboration with the functional brances of the China Division, aggregative-type economic intelligence on an all-source basis on Communist China, North Korea, and Mongolia, and for contributing to the coordination of such intelligence production within the US Government.

The responsibility of this Branch includes the provision of economic intelligence on the following:

a. National output, investment, and economic growth

b. Economic policy, planning, and administration

c. Economic accounts by sector of origin and by end use

d. Economic organization and management

e. Economic impact of military and space programs

f. Railroads, highways, inland and coastal waterways, domestic airlines, and international overland transportation services

g. Budgetary, fiscal, and pricing studies

h. Domestic and international trade and finance

i. Consumer welfare and standard of living

j. Human resources -- including population, manpower, and employment

k. Wages, incentives, and productivity

2. Industries Branch

The Industries Branch is responsible for producing all-source economic intelligence on general industry and on the manufacturing industries in Communist China, North Korea, and Mongolia, and for contributing to the coordination of such intelligence production within the US Government.

The responsibility of this Branch includes the provision of economic intelligence on the following:

a. General industrial problems -- including industrial support to military programs

b. General industrial machinery and equipment -- including machine tools

c. Metallurgy and mining and the industrial equipment related thereto

d. Electronic equipment and instruments

e. Transportation, construction, and agricultural equipment

f. Non-food consumer goods

g. Imports of equipment related to the industries listed in subparagraphs b through f, above

3. Resources Branch

The Resources Branch is responsible for producing all-source economic intelligence on agriculture and on the fuels, power, and chemicals industries in Communist China, North Korea, and Mongolia, and for contributing to the coordination of such intelligence production within the US Government.

The responsibility of this Branch includes the provision of economic intelligence on the following:

a. Petroleum and natural gas

b. Solid fuels and electric power

c. Chemicals and chemical processes

d. Processing of food products

e. Production, distribution, and consumption of agricultural products

f. Imports of equipment related to the industries listed in subparagraphs a through e, above.

g. Agricultural organization and policy

B. USSR/EASTERN EUROPE DIVISION

The USSR/Eastern Europe Division is responsible for producing, in collaboration with other OER Divisions, all-source economic intelligence on the USSR and on the Eastern European Communist countries; for intelligence production and support for US and international export control programs and related economic defense measures; for contributing to the coordination of such intelligence production within the US Government; and for contributing within its field of responsibility to National Intelligence Estimates, reports of USIB committees, and National Intelligence Surveys.

The responsibility of this Division includes, generally, the provision of economic intelligence on the following: national output, investment, and economic growth; economic policy, planning, and administration; economic impact of military and space programs; fuels

and power; manufacturing and mining; agriculture and food supply; internal transportation; domestic and international trade and finance; consumer welfare and standard of living; human resources -- including population, manpower, and employment; and US and multilateral embargo and other economic defense programs.

1. USSR Branch

The USSR Branch is responsible for production, in collaboration with the functional branches of the USSR/Eastern Europe Division, aggregative-type economic intelligence on an all-source basis on the USSR, and for contributing to the coordination of such intelligence production within the US Government.

The responsibility of this Branch includes the provision of economic intelligence on the following:

a. Economic policy, planning, and administration

b. Economic organization and management

c. Budgetary, fiscal, and pricing studies

d. Domestic and international trade and finance

e. Consumer welfare and standard of living

f. Human resources -- including population, manpower, and employment

g. Wages and incentives

h. Production, distribution, and consumption of agricultural products

2. Eastern Europe Branch

The Eastern Europe Branch is responsible for producing, in collaboration with the functional branches of the USSR/Eastern Europe Division, aggregative-type economic intelligence on an all-source basis on the Eastern European Communist countries, and for contributing to the coordination of such intelligence production within the US Government.

The responsibility of this Branch includes the provision of economic intelligence on the following:

a. National output, investment, and economic growth

b. Economic policy, planning, and administration

c. Economic accounts by sector of origin and by end use

d. Economic organization and management

e. Economic impact of military and space programs

f. Budgetary, fiscal, and pricing studies

g. Domestic and international trade and finance

h. Consumer welfare and standard of living

i. Human resources -- including population, manpower, and employment

j. Wages, incentives and productivity

k. Production, distribution, and consumption of agricultural products

3. Industries Branch

The Industries Branch is responsible for producing all-source economic intelligence on the manufacturing industries and on industrial raw materials (except chemicals) in the USSR and the Eastern European Communist countries, and for contributing to the coordination of such intelligence production within the US Government.

The responsibility of this Branch includes the provision of economic intelligence on the following:

a. General industrial machinery and equipment -- including machine tools

b. Metallurgy and mining, and the industrial equipment related thereto

c. Electronic equipment and instruments

d. Agricultural machinery and equipment

e. Transportation and construction equipment

f. Non-food consumer goods

g. Food processing, forest products, and fishing

h. Automation and technical change

4. Resources Branch

The Resources Branch is responsible for producing all-source economic intelligence on the fuels, power, and chemical industries in the USSR and the Eastern European Communist countries, and for contributing to the coordination of such intelligence production with the US Government.

The responsibility of this Branch includes the provisions of economic intelligence on the following:

a. Petroleum and natural gas

b. Solid fuels, electric power, and nuclear energy

c. Chemicals and chemical processes

d. Imports, production, and supply of equipment related to the industries listed in subparagraphs a through c, above

5. Strategic Impact Branch

The Strategic Impact Branch is responsible for producing all-source economic intelligence on national economic accounts, on economic growth and productivity, on the economic impact of military and space programs, and on aggregate industrial production and investment in the USSR; and for contributing to the coordination of such intelligence production within the US Government.

6. Trade and Transportation Branch

The Trade and Transportation Branch is responsible for providing, in collaboration with other OER Divisions and Branches, all-source economic intelligence on the foreign trade and related institutional arrangements of the USSR and on inland transportation in the USSR and the Eastern European Communist countries; for economic intelligence production and related support for US and other international export control programs and other economic defense measures designed to prevent the import by the Communist countries of advanced military equipment and related industrial technology; and for contributing to the coordination of such intelligence production within the US Government.

II. INTERNATIONAL RESEARCH AREA

The International Research Area is responsible for producing all-source economic intelligence on the Free World countries of Western Europe, Africa, the Near and Far East, the Western Hemisphere and in addition, the Communist countries of Cuba and North Vietnam; for producing, on a worldwide basis, all-source economic intelligence on international transportation, economic and military aid, trade, communications, and construction; for contributing to the coordination of such intelligence production within the US Government; and for contributing within its field of responsibility to National Intelligence Estimates, reports of USIB committees, and National Intelligence Surveys.

A. FREE WORLD DIVISION

The Free World Division is responsible for producing, in collaboration with other OER Divisions, all-source economic intelligence on all countries of the Free World (with the exception of South Vietnam, Laos, Cambodia, and Thailand) and on Cuba; for contributing to the coordination of such intelligence production within the US Government; and for contributing within its field of responsibility to National Intelligence Estimates, reports of USIB committees, and National Intelligence Surveys.

The responsibility of this Division includes, generally, the provision of economic intelligence on the following: economic problems affecting US policy; economic growth and development, both national and sectorial; economic policy and planning -- including regional or other extra-national relationships; international trade and finance; economic impact of external aid and trade activities and programs -- including economic, military, and technical aid and exchange; and economic impact of military and space programs.

1. Africa Branch

The Africa Branch is responsible for producing all-source economic intelligence on the countries of Africa (excluding North Africa), and for contributing to the coordination of such intelligence within the US Government.

The responsibility of this Branch includes the provision of economic intelligence on the following:

a. Economic problems affecting US policy

b. Economic growth and development

c. Economic policy and planning

d. International trade and finance

e. Economic cooperation within the region

f. Economic impact on African countries of external aid and trade activities and programs

2. Near East Branch

The Near East Branch is responsible for producing all-source economic intelligence on the countries of the Near East and North Africa, and for contributing to the coordination of such intelligence production within the US Government.

The responsibility of this Branch includes the provision of economic intelligence on the following:

a. Economic problems affecting US policy

b. Economic growth and development

c. Economic policy and planning

d. International trade and finance

e. Economic cooperation within the region

f. Economic impact on Near Eastern and North African countries of external aid and trade activities and programs.

g. Economic impact of military programs

3. Orient Branch

The Orient Branch is responsible for producing all-source economic intelligence on the non-Communist countries of Asia (excluding South Vietnam, Laos, Cambodia [redacted] and the Pacific Area, and for contributing to the coordination of such intelligence production within the US Government.

25X1

The responsibility of this Branch includes the provision of economic intelligence on the following:

a. Economic problems affecting US policy

b. Economic growth and development

c. Economic policy and planning

d. International trade and finance

e. Economic cooperation within the region

f. Economic impact on non-Communist Asian countries of external aid and trade activities and programs

g. Economic impact of military and space programs

25X6

5. Western Hemisphere Branch

The Western Hemisphere Branch is responsible for producing all-source economic intelligence on all countries of Latin America (including Cuba), and for contributing to the coordination of such intelligence procution within the US Government.

The responsibility of this Branch includes the provision of economic intelligence on the following:

a. Economic problems affecting US policy

b. Economic growth and development

c. Economic policy and planning

d. International trade and finance

e. Economic cooperation within the region

f. Economic impact on Latin American countries (including Cuba) of external aid and trade activities and programs

B. INDOCHINA DIVISION

The Indochina Division is responsible for producing, in collaboration with other OER Divisions, all-source economic and related intelligence on South Vietnam, North Vietnam, Laos, Cambodia, [redacted] for contributing to the coordination of such intelligence production within the US Government; and for contributing within its field of responsibility to National Intelligence Estimates, reports of USIB Committees, and National Intelligence Surveys. The Division is concerned especially with producing economic intelligence bearing on the present conflict in Southeast Asia.

25X1

The responsibility of this Division includes, generally, the provision of economic and related intelligence on the following: national output, investment, and economic growth; economic policy, planning, and administration; the economic impact of military programs, including bomb damage assessment, logistical requirements of enemy forces, Communist military and economic assistance, enemy manpower resources and requirements, and the economic impact of Communist insurgency and the impact of the US military presence on friendly economies; friendly manpower resources; and, in South Vietnam, the economic effects of pacification; agriculture,

transportation, industry, and economic services; international trade and finance; consumer welfare and standard of living; and human resources -- including population, manpower, and employment.

1. Logistics Branch

The Logistics Branch is responsible for producing all-source economic intelligence on the infrastructure supporting the requirements for, and the movement of, supplies and personnel in North Vietnam, South Vietnam, Laos, Cambodia, [redacted] and for contributing to the coordination of such intelligence production within the US Government.

25X1

The responsibility of this Branch includes the provision of economic intelligence on the following:

a. Capacities, use, and organization of all transportation services (including railroads, highways, inland and coastal waterways, and domestic airlines), especially those used by the Communists

b. Construction and use of new railroads, roads, trails, and other transportation facilities

c. Location and mode of operation of other enemy logistical facilities that support the movement of military supplies and personnel, such as: storage and base areas, transshipment and staging areas

d. Requirements for logistic support by enemy forces; the origin and flow of logistic support, by type of supplies

2. North Vietnam Branch

The North Vietnam Branch is responsible for producing all-source economic intelligence on North Vietnam, and for contributing to the coordination of such intelligence production within the US Government.

The responsibility of this Branch includes the provision of economic intelligence on the following:

a. National output, investment, and economic growth

b. Economic policy, planning, and administration

c. Agriculture, industry, and economic services

d. International trade and finance

e. Human resources -- including population, manpower, and employment

f. Economic and military assistance

g. Impact of the war in Southeast Asia on the economy -- including bomb damage assessment, air operations, civilian casualties, and logistical requirements

3. South Vietnam Branch

The South Vietnam Branch is responsible for producing all-source intelligence on the economy of South Vietnam and on various aspects of enemy force structure, military operations, and manpower availability; and for contributing to the coordination of such intelligence production within the US Government.

The responsibility of this Branch includes the provision of economic intelligence on the following:

a. National output, investment, and economic growth

b. Economic policy, planning, and administration

c. Agriculture, industry, and economic services

d. International trade and finance

e. Human resources -- including population, manpower, and employment

f. Impact of US economic and military assistance on the viability of the economy

g. The Viet Cong economy in South Vietnam -- including policies, organization, administration and control, fiscal operations

h. Impact of ground operations on:

(1) manpower resources -- including creation of refugees
(2) ability of the enemy to maintain its infrastructure and sustain its military forces

(3) various aspects of revolutionary development

i. Viet Cong/North Vietnamese Army manpower including:

(1) order of battle

(2) recruitment and infiltration

(3) personnel losses

25X6

4. [redacted] Laos, and Cambodia Branch

This Branch is responsible for producing all-source economic intelligence on Cambodia, Laos, [redacted]; and for contributing to the coordination of such intelligence production within the US Government. 25X1

The responsibility of this Branch includes the provision of economic intelligence on the following:

a. General economic trends -- including national output, investment, and growth

b. Agriculture and rural development programs

c. International trade and economic assistance

d. Interrelationships between economic developments and the growth of insurgency

e. Impact of the war in Southeast Asia on these economies, including:

(1) the economic support derived from these countries by the Communist forces in South Vietnam

(2) the illegal use of neutral territory (i.e., Cambodia) by Communist forces engaged in the war in South Vietnam

C. INTERNATIONAL SERVICES DIVISION

The International Services Division is responsible for producing, in collaboration with other OER Divisions, all-source economic intelligence on a worldwide basis on international transportation, economic and military aid, foreign trade, communications, and construction; for contributing to the coordination of such intelligence production within the US Government; and for contributing within its field of responsibility to National Intelligence Estimates, reports of USIB committees, and National Intelligence Surveys.

1. Communications Branch

The Communications Branch is responsible for producing all-source economic intelligence on a worldwide basis on the facilities and activities of organized systems of communications (post and tele-communications); for supporting other OER Divisions and Branches in the general field of communications; and for contributing to the coordination of such intelligence production within the US Government.

2. Construction Branch

The Construction Branch is responsible for producing all-source economic intelligence on a worldwide basis on the construction of fixed installations and on the production of construction materials; for supporting other OER Divisions and Branches in the general fields of construction and civil engineering; and for contributing to the coordination of such intelligence production within the US Government.

3. International Transportation Branch

The International Transportation Branch is responsible for producing all-source economic intelligence on international maritime, land transport, and civil air activities and on international petroleum shipments; for supporting other OER Divisions and Branches in these fields; and for contributing to the coordination of such intelligence within the US Government.

4. Trade and Aid Branch

The Trade and Aid Branch is responsible for producing all-source economic intelligence on the relations between Communist countries (except Cuba) and the less developed non-Communist countries, including trade and economic and military aid programs and the related training, propaganda, cultural, and subversive aspects of these activities; for producing all-source economic intelligence on the general trends in trade and aid between developed and less developed non-Communist countries, including the commercial and other economic policies governing these relationships; for supporting other OER Divisions and Branches in the foregoing subject areas, including trade statistics on a global basis; and for contributing to the coordination of such intelligence production within the US Government.

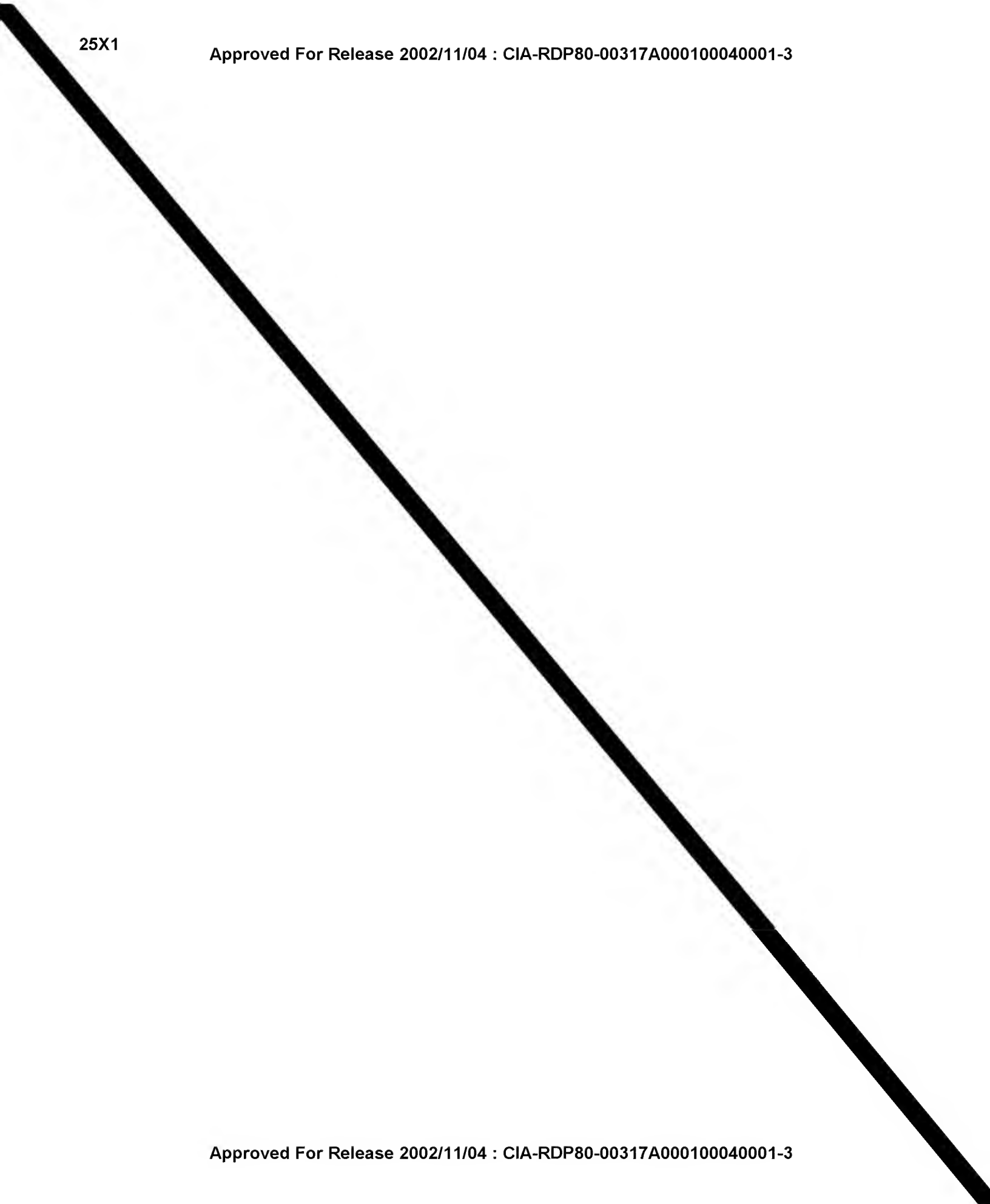
III. STAFFS

A. CURRENT SUPPORT STAFF

The Current Support Staff, in collaboration with other OER divisions and staffs, is responsible for the production and coordination of all-source current economic intelligence pertaining to Communist countries, and to non-Communist countries as appropriate, in support of OER's responsibilities to other components of the Agency and the intelligence community. It also is responsible for assuring that current intelligence prepared within OER or referred to OER for coordination and review is consistent with OER's latest research.

B. SYSTEMS DEVELOPMENT STAFF

The Systems Development Staff was established 11 February 1969. The staff will promote the application of ADP and other new research techniques to economic intelligence.



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